THE UNIVERSITY OF ARIZONA
COLLEGE OF MEDICINE TUCSON
Emergency Medicine

Academic Program Review
Self-Study Report
2009-2016

A word cloud was created from words selected by the University of Arizona Department of Emergency Medicine faculty that best described the values of our Research, Clinical, Education, and Administrative divisions. Faculty voted on the selected words that were most important to consider when deciding the department's future.

Artist Jennifer Bao used the elements of our old logo – mountains, saguaro and star – to pay homage to our past while our words help to determine our future. We hope you like this unique word cloud and take a few minutes to search out some of the words below.

Research Stars	Clinical Mountain	Education Saguaro	Administrative Mountain Top
Innovation	Heal	Know	Collaboration
Creativity	Resuscitate	Knowledge	Teamwork
Discovery	Empathy	Learning	Integrity
Vision	Healing	Understanding	Ethical
Transform	Sensitivity	Judgment	Cooperate
Observe	Respect	Energize	Impartial
Imagination	Comfort	Wisdom	Consistency
Insight	Kindness	Teaching	Active
Intuition	Restore	Cultivate	Unity
Invent	Therapeutic	Comprehension	Vigilant
	Passion	Mastery	Receptive
	Sympathy	Inspiration	Resource
	Cure	Confidence	
	Strength	Knowledgeable	
	Aid	Awareness	
	Courage	Intellect	
	Attend	Informed	
	Healthy	Study	
	Sustain	Talent	
	Mend		
	Reassurance		
	Revive		
	Rejuvenate		
	Goodwill		
	Warmhearted		
	Soothe		
	Convalesce		
	Solace		
	Nourish		
	Rehabilitate		
	Renew		
	Remedy		
	Tranquility		
	Flourish		
	Tranquility		
	Perceive		
	Nuance		

ABOUT THE ARTIST

Jennifer Bao is a third-year medical student at the UA College of Medicine. She grew up in Tucson and studied biochemistry as an undergraduate at the UA. Her artistic vision is rooted in drawing, especially of the human face and form. Observation, memory, and emotion are the most important drivers of her work. Jennifer's online portfolio can be found at www.jenniferbao.daportfolio.com.

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APPENDICES

TABLES

FIGURES

ACRONYMS

AAAEM	Academy of Administrators in Academic Emergency Medicine
AACEM	Association of Academic Chairs of Emergency Medicine
AAMC	Association of American Medical Colleges
ABOR	Arizona Board of Regents
ABEM	American Board of Emergency Medicine
ABMS	American Board of Medical Specialties
ACEP	American College of Emergency Physicians
ACGME	Accreditation Council for Graduate Medical Education
ADHS	Arizona Department of Health Services
ADPR	Advanced Disaster Preparedness & Response
AED	Automated External Defibrillators
AEMRC	Arizona Emergency Medicine Research Center
AGCR	Adjusted Gross Collection Rate
AHA	American Heart Association
AHA-ReSS	American Heart Association Resuscitation Science Symposium
AHLS	Advanced Hazmat Life Support
AI	Acting Internship Rotation
AY	Academic Year
B-UMCT	Banner – University Medical Center Tucson
B-UMCS	Banner – University Medical Center South
B-UMCP	Banner – University Medical Center Phoenix
BUMG	Banner – University Medical Group
CCM	Critical Care Medicine
CCU	Cardiac Care Unit
CDEM	Clerkship Directors of Emergency Medicine
COCPR	Compression-only Cardiopulmonary Resuscitation
CPR	Cardiopulmonary Resuscitation
CMS	Centers for Medicare & Medicaid Services
CORD	Council of Emergency Medicine Residency Directors
CSPC	Consumer Product Safety Commission
CY	Calendar Year
ECP	Emergency Medicine Practitioner
ED	Emergency Department
EKG	Electrocardiogram
EM	Emergency Medicine
EM/CC	Emergency Medicine/Critical Care Rotation
EMF	Emergency Medicine Foundation
EMIG	Emergency Medicine Interest Group
EMRA	Emergency Medicine Residents Association
EMS	Emergency Medical Services
EPIC	Excellence in Prehospital Injury Care
ERAS	Electronic Residency Application Service

FAST Exam	Focused Assessment with Sonography in Trauma
FIT	Fast Interview Track
FTE	Full-time Employee
FPSC	Faculty Practice Solutions Center
FY	Fiscal Year
GECC	Global Emergency Care Collaborative
GME	Graduate Medical Education
ICU	Intensive Care Unit
ITE	In-Training Exam
IRB	Institutional Review Board
LWBS	Left Without Being Seen
MICU	Medical Intensive Care Unit
NAEMSP	National Association of EMS Physicians
NBME	National Board of Medical Examiners
NETT	Neurological Emergencies Treatment Trials Network
NIH	National Institutes of Health
NIND	National Institute for Neurological Disorders
NP	Nurse Practitioner
OHCA	Out-of-Hospital Cardiac Arrest
PBO	Professional Business Office
PECARN	Pediatric Emergency Care Applied Research Network
PGY	Postgraduate Year
P&T	Promotion and Tenure
RAP	Research Associates Program
RCT	Randomized Controlled Trials
REACT	Resuscitation Education and CPR Training Group
RME	Rapid Medical Evaluation
RRC	Residency Review Committee
RVU	Relative Value Unit
SAEM	Society for Academic Emergency Medicine
SAVAHCS	Southern Arizona VA Health Care System
SHARE	Save Hearts in Arizona Registry & Education Program
TBI	Traumatic Brain Injury
TCPR	Telephone Cardiopulmonary Resuscitation
TEPC	Tucson Educational Policy Committee
UAHS	University of Arizona Health Sciences
UAHN	University of Arizona Health Network
UMC	University Medical Center
UPH	University Physicians Healthcare
USIG	Ultrasound Interest Group
USMLE	U.S. Medical Licensing Examination

FAST STATS FY 2017

2
Research Centers of Excellence:
Arizona Emergency Medicine Research Center – Tucson
Arizona Emergency Medicine Research Center – Phoenix

TUCSON
PHOENIX

18th
NIH Ranking

59 Faculty

Faculty Distribution by Rank

Professor Emeritus

1

Professors

15

29

Assistant Professors

14

Associate Professors
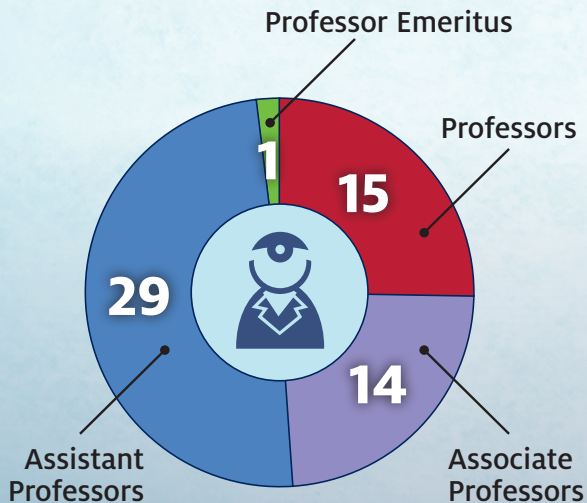
11 Fellows

Fellowship Programs

- Critical Care*
- Emergency Medical Services*
- Hospice & Palliative Medicine*
- Medical Toxicology*
- Sports Medicine*
- Academic Research
- Clinical Informatics
- Emergency Ultrasound
- Medical Simulation

ACGME-accredited fellowships

Clerkships

- Emergency Medicine/ Critical Care Rotation
- Acting Internship in Emergency Medicine
- Emergency Medicine Elective
- Medical Toxicology Elective
- Wilderness Medicine Elective
- Emergency Ultrasound Elective

135,000
Emergency Room Patient Visits

$2.25 million
Annual Research Funding

$65 million
Gross Charges

$24 million
All Funds Budget

Active Faculty Distribution by Track

30
Clinical Scholar Track

10
Tenure Track

2
Research Track

15
Clinical Series Track

1
Educator Track

Residency Programs

78
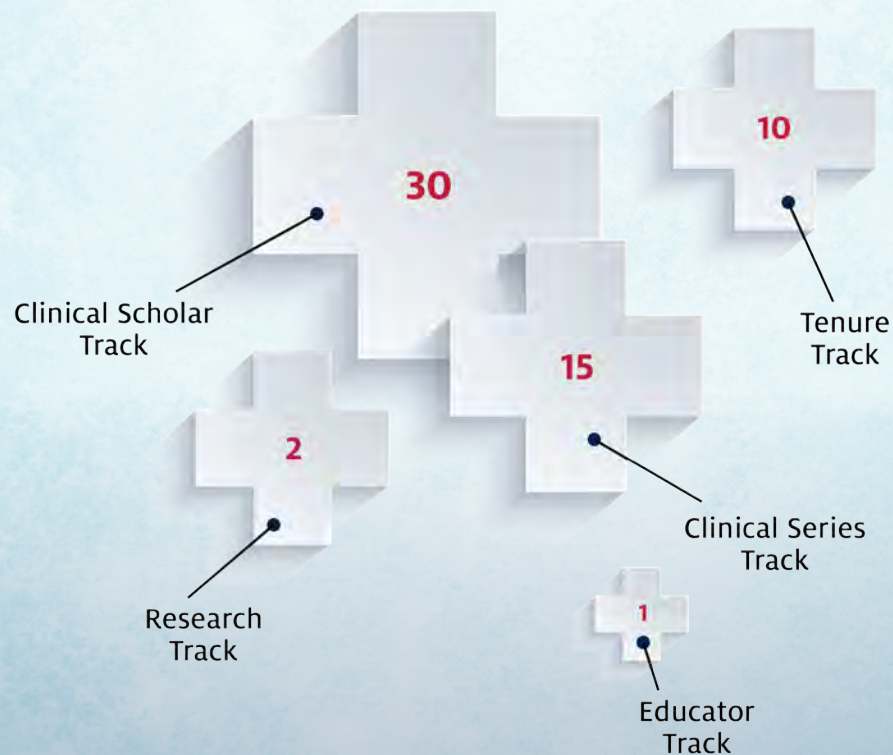
45 residents University of Arizona College of Medicine – Tucson Program
18 residents University of Arizona College of Medicine at South Campus Program
15 residents University of Arizona College of Medicine Combined Emergency Medicine/Pediatrics Program

Emergency Medicine Faculty 2016-17

Samuel M. Keim, MD, MS
Distinguished Professor, Emergency Medicine
    and Public Health
Department Chair
Director, AEMRC

Josie G. Acuña, MD
Clinical Instructor

Srikar Adhikari, MD, MS, RDMS
Associate Professor
Section Chief, Emergency Ultrasound
Director, Emergency Ultrasound Fellowship

Todd Alter, MD, MS, FAAEM
Clinical Assistant Professor

Richard Amini, MD, RDMS
Associate Professor
Director, Emergency Ultrasound,
    Banner – UMC South
Assistant Dean, Student Affairs

Joshua Appel, MD
Clinical Associate Professor
Associate Medical Director, Adult and
    Trauma Services, Banner – UMC
    Tucson

Matthew Berkman, MD, FACEP
Clinical Associate Professor
Medical Director, Banner – UMC South

Daniel Beskind, MD, MPH, FACEP
Associate Professor
EMS Director, Banner – UMC South

Bentley J. Bobrow, MD, FACEP, FAHA
Distinguished Professor
Associate Director, AEMRC – Phoenix
Medical Director, ADHS Bureau of EMS &
    Trauma System

Hans Bradshaw, MD
Assistant Professor, Emergency Medicine
    and Pediatrics
Medical Director, UA Student EMS Group

Charles B. Cairns, MD, FACEP, FAHA
Professor
Dean, College of Medicine – Tucson
UAHS Assistant Vice President, Clinical
    Research and Clinical Trials

Lisa Chan, MD
Professor
Medical Director, Banner – UMC Tucson
Director, Clinical Informatics Fellowship

Lawrence DeLuca, Jr., EdD, MD
Associate Professor
Director, Infectious Disease Research
    Collaboration

Kurt Denninghoff, MD
Distinguished Professor
Professor of Optical Sciences
Associate Head, Research

Emergency Medicine Faculty 2016-17 *continued*

Bradley A. Dreifuss, MD, FACEP
Assistant Professor
Director, Rural and Global Health
    Program

Jeremy Greenberg, MD
Clinical Instructor

Brian S. Drummond, MD, FAAEM
Clinical Assistant Professor

John A. Guisto, MD, FACEP
Professor

Isaac Farrell, MD
Clinical Assistant Professor
Assistant Director, EM Residency South
    Campus Program
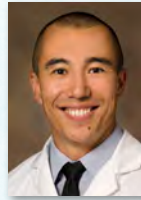
Marvin "Sunny" Harris, MD
Clinical Instructor

Albert B. Fiorello, MD, RDMS, FAAEM, FACEP
Associate Professor
Director, EM Residency Tucson Program

Katherine Hiller, MD, MPH, FACEP
Professor
Director, Undergraduate Education

Robert N.E. French, MD, MPH
Assistant Professor
Assistant Medical Director, Prehospital
    Hazmat Operations

Nicholas B. Hurst, MD, MS
Assistant Professor

Lucas Friedman, MD, MEd
Assistant Professor

Suzanna I. Hutchinson, MD
Clinical Assistant Professor
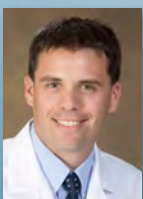
Joshua B. Gaither, MD, FACEP
Associate Professor
Associate Medical Director,
    Banner – UMC Tucson
Director, EMS Fellowship

Cameron Hypes, MD, MPH, FAAEM
Assistant Professor

Emergency Medicine Faculty 2016-17 *continued*
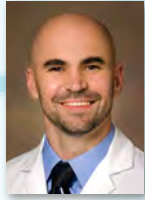
Steven C. Irving, MD
Clinical Instructor
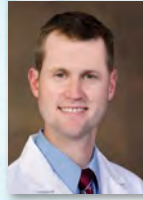
Aaron Leetch, MD, FACEP
Assistant Professor
Associate Director, EM and Combined
    EM/Peds Residency Programs
Associate Director, EM Residency Tucson
    Program
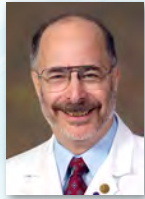
Kenneth V. Iserson, MD, MBA, FACEP, FAAEM
Professor Emeritus

J. Scott Lowry, MD, FACEP
Clinical Assistant Professor
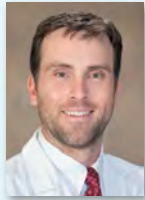
Nathaniel Johnson, MD, FACEP, FAAP
Clinical Assistant Professor

Harvey W. Meislin, MD, FACEP, FAAEM
Professor

Bernhard Knoblich, MD
Clinical Assistant Professor

Jenny Mendelson, MD
Assistant Professor
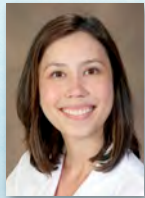
Terri Kresha, MD
Clinical Assistant Professor

Kubwimana Moses Mhayamaguru, MD, EMT-P
Clinical Instructor
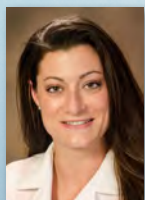
Allison Lane, MD
Assistant Professor

Alice Min Simpkins, MD, FACEP
Associate Professor
Associate Director, EM Residency Tucson
    Program

Jaiva Larsen, MD
Clinical Instructor

Katelin Morrissette, MD
Clinical Instructor

Jarrod Mosier, MD
Associate Professor, Emergency
    Medicine and Internal Medicine
Associate Program Director, Critical Care
    Fellowship

Michelle Rhodes, MD
Assistant Professor, Emergency Medicine and
    Palliative Medicine
Associate Director, Hospice and Palliative
    Medicine Fellowship

Vivienne Ng, MD, MPH
Assistant Professor
Director, Emergency Medicine
    Simulation
Director, Medical Simulation Fellowship
Associate Director, EM Residency
    Tucson Program

Amber Rice, MD
Clinical Instructor

Tomas Nuño, PhD
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Director, Biostatistics and
    Epidemiology

Peter Rosen, MD, FACS, FACEP, FAAEM
Clinical Professor

Michael Ori, MD
Clinical Instructor

John C. Sakles, MD
Professor

Garrett Pacheco, MD
Assistant Professor

Arthur B. Sanders, MD, MSHA, FACEP, FACP
Professor
Director, Geriatric Emergency Research
    Collaboration

Jennifer L. Plitt, MD
Clinical Instructor
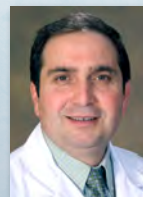
Mazda Shirazi, MD, PhD, FACEP, FACMT
Associate Professor
Medical Director, Arizona Poison and Drug
    Information Center
Director, Medical Toxicology Fellowship

Kevin Reilly, MD
Associate Professor
Director, ED Information Systems

Elaine Situ-LaCasse, MD
Clinical Instructor

Jennifer Smith, MD, PharmD
Assistant Professor
Associate Medical Director,
   Banner – UMC South

Terence Valenzuela, MD, MPH, FACEP, FACP
Professor
Medical Director, Tucson Fire Department

Daniel W. Spaite, MD, FACEP
Professor
Virginia Piper Distinguished Chair of
   Emergency Medicine
Director, EMS Research Collaboration

Chad Viscusi, MD, FAAEM, FAAP, FACEP
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Associate Medical Director, Pediatric ED,
   Banner – UMC Tucson
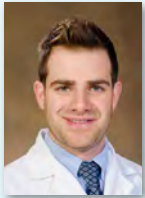
Nicholas J. Stea, MD
Clinical Assistant Professor

Frank G. Walter, MD, FACEP, FACMT, FAACT
Professor
Director, Knowledge Transfer Research
   Collaboration

Lori Stolz, MD, RDMS, FACEP
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Emergency Ultrasound Director,
   Banner – UMC Tucson

Anna Waterbrook, MD, FACEP
Associate Professor
Associate Director, EM Residency South
   Campus Program
Associate Director, Sports Medicine
   Fellowship

Uwe Stolz, PhD, MPH
Research Assistant Professor
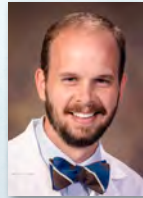
Christopher G. Williams, MD, FAWM
Clinical Assistant Professor
Assistant Medical Director, Wilderness
   Medicine

Lisa Stoneking, MD, FACEP, FAAEM
Associate Professor
Director, EM Residency South Campus
   Program

Dale Woolridge, MD, PhD, FAAEM, FAAP, FACEP
Professor, Emergency Medicine and
   Pediatrics
Director, Combined EM/Peds Residency
   Program

Noah Tolby, MD
Clinical Assistant Professor

Mark Wright, MD
Clinical Assistant Professor
Medical Director, Fast Track,
   Banner – UMC South

Self-Study Summary

Photo by Kevin Reilly, MD

A. SELF-STUDY SUMMARY

A.1. Role of the Department

After 30-plus years of unprecedented growth and maturation, the relatively young specialty of emergency medicine has demonstrated the advanced, well-honed scientific, clinical and educational skills that are comparable to the rest of the medical specialties. The University of Arizona Department of Emergency Medicine, a relatively young department at the UA College of Medicine, similarly has displayed the same evolution since attaining department status in 2001.

Our faculty members commonly are seen in medical school and health-care leadership positions, leading collaborative research networks and receiving honors for their teaching. The department is proud to have an active teaching role in all four years of the ArizonaMed curriculum, most notably, the Emergency Medicine/Critical Care Rotation for fourth-year medical students. Our faculty members serve as college Society Mentors for medical students and provide leadership for many aspects of the preclinical curriculum. The department has a strong legacy of three top-tier residency programs and multiple fellowships.

In research, the department has established one of the most respected records at the college and in the specialty. Milestone achievements have been made in prehospital care, cardiac arrest, trauma resuscitation, medical education, medical toxicology, emergency bedside ultrasound and pediatric emergency medicine.

All College of Medicine clinical areas interface with emergency medicine. Our physicians initiate the diagnosis of patients with acute presentations in the emergency department and coordinate additional care with physicians from other specialties. Therefore, the department maintains close and collaborative working relationships with other College of Medicine departments to provide our patients exceptional care. We are pleased to have College of Medicine Dean Dr. Charles Cairns as a clinically active member of the Department of Emergency Medicine. We are well-positioned for the future.

A.2. Faculty

To ensure excellence in all three missions (clinical, research and education), department faculty are distributed on various university academic tracks. Tenured Track faculty members play key roles as researchers and career mentors for the Clinical Scholar Track faculty. Clinical Series Track faculty members play an important role with bedside teaching and clinical service. The Clinical Scholar and Educator Scholar Tracks faculty members are core "triple threat" faculty and are in many ways the heart and soul of the department.

As of the end of 2016, the Department of Emergency Medicine has a total of 59 faculty members with 10 (8.6 FTE) on the Tenure Track, 30 (28.72 FTE) on the Clinical Scholar Track, 15 (12.63 FTE) on the Clinical Series Track, one (1.0 FTE) on the Educator Scholar Track, and two (1.0 FTE plus one per diem individual) on the Research Track. The department also has one professor emeritus. **TABLE A.1.** below outlines the faculty per academic track and rank.

TABLE A.1. Faculty Per Track and Rank

	Tenure Track	Clinical Scholar Track	Clinical Series Track	Educator Scholar Track	Research Track
Professor	9	5	1	0	0
Associate Professor	1	10	2	1	0
Assistant Professor	0	15	12	0	2
Total	10	30	15	1	2

FIGURE A.1. illustrates the department's growth from 12 faculty members when the department was established in 2001 to 36 since the last APR in 2009 to 59 to date. This growth is a response to both clinical and academic opportunities.

FIGURE A.1. Department Growth
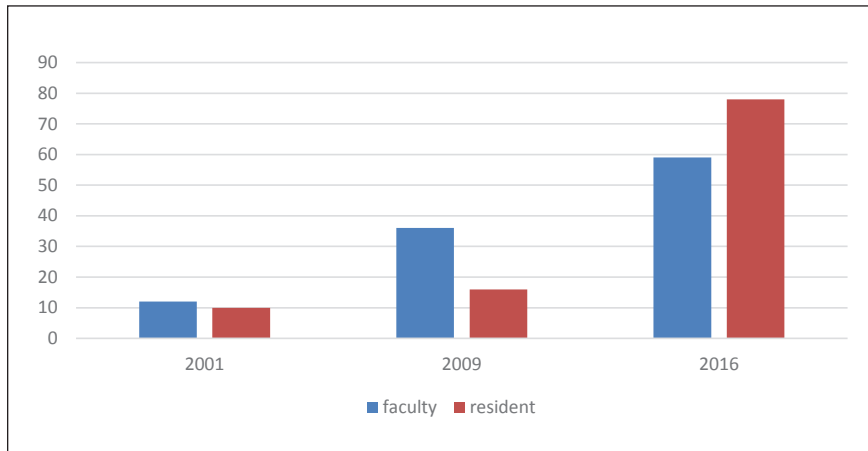
A.3. Fellows and Residents

The department trains 78 residents and 11 fellows in our residency and fellowship programs. There are 45 residents in the Tucson Program, 18 in the South Campus Program and 15 in the Combined Emergency Medicine/Pediatrics Program.

A.4. Accredited Residency and Fellowship Programs

The department has three Accreditation Council for Graduate Medical Education (ACGME)-accredited residency programs:
1. University of Arizona College of Medicine – Tucson Program
2. University of Arizona College of Medicine at South Campus Program
3. University of Arizona College of Medicine Combined Emergency Medicine/Pediatrics Program

TABLE A.2. lists the department's fellowship programs**.** The department sponsors or supports five ACGME-accredited and four non-ACGME accredited fellowship programs.

TABLE A.2. Fellowship Programs

Fellowship Programs	Length	Accredited	Co-Sponsor
Critical Care	2 years	✓	Pulmonary/Critical Care
Emergency Medical Services (EMS)	1 year	✓	
Hospice & Palliative Medicine	1 year	✓	Medicine
Medical Toxicology	2 years	✓	
Sports Medicine	1 year	✓	Family Medicine
Academic Research	1-2 years		
Clinical Informatics	2 years		
Emergency Ultrasound	1 year		
Medical Simulation	1 year		

Department Description and Goals

Photo by Kevin Reilly, MD

B. DEPARTMENT DESCRIPTION AND GOALS

B.1. Description

The Department of Emergency Medicine has never been stronger. This strength is both an objective reality measured by common metrics, as well as a perception by its members of the exciting possibilities for future growth.

Over the last five years, the department has held 10 annual focused mini-retreats involving 90 percent of the faculty. These faculty mini-retreats have led to annual leadership retreats, producing a continuously evolving strategic mission and key objectives. Specific annual goals for each of the 10 purpose-driven programs or clinical services have been created, approved by the general faculty, implemented and evaluated. Each program leader presents quarterly updates in written and oral form to the general faculty. In short, the department has become a member-driven, continuously innovative, organized and accountable entity.

Mission. The Department of Emergency Medicine strives to become the benchmark by which others measure excellence by providing excellent medical care, innovative and effective learning programs, as well as world-class original research.

Vision. We advance health and the specialty of emergency medicine by always being our patients' advocates and demonstrating respectful, compassionate and attentive care. We listen to our patients and visitors and keep them informed as we provide the most efficient and thorough emergency care. We help learners exceed basic competence and become true specialists. We help advance the principles and practice of our specialty through original research that is internationally recognized for impact and innovation.

Role and Scope. Academic emergency medicine at the UA College of Medicine began September 1980 as a section of the Department of Surgery. At that time, the section consisted of only four full-time faculty physicians and the then-named University Medical Center census was less than 20,000 emergency department patient visits annually. No trauma centers existed in Arizona.

During FY 2016, Banner – University Medical Center Tucson (B-UMCT) and Banner – University Medical Center South (B-UMCS) emergency departments' census has grown to 135,000 patient visits a year. The B-UMCT Emergency Department is the only Level I Trauma Center in the entire Southern Arizona region. The vast majority of patient admissions for both hospitals originate in the emergency departments. See data on hospital arrivals and admissions FY 2012-16 in **APPENDIX A.**

The **h-index** is an author-level metric that attempts to measure both the productivity and citation impact of the publications of a scientist or scholar. The **index** is based on the set of the scientist's most cited papers and the number of citations that they have received in other publications. Our department compares very favorably academically with our peer group when using the h-index as a gauge of publications by the faculty. Arizona ranks at the top of this peer group with 13 percent of our faculty with h-index of 20 or greater. Our department has the second lowest percentage of unpublished faculty. Typically, these are clinical faculty or new faculty without a publication history. Our midrange h-scores (15-30) are quite high, which would be expected based on our rapidly growing faculty focused on their roadmaps and promotion. **FIGURE B.1.** represents the percent of faculty who are at or above the h-index on the X-axis. The table in **APPENDIX B** provides the actual percentages compared with peer institutions.

FIGURE B.1. H-Index Compared with Peer Institutions

Percent of Faculty Above H-Index

H-Index Numbers: ■ 0 ■ >5 ■ >10 ■ >15 ■ >20 ■ >25 ■ >30 ■ >35 ■ >40 ■ >45
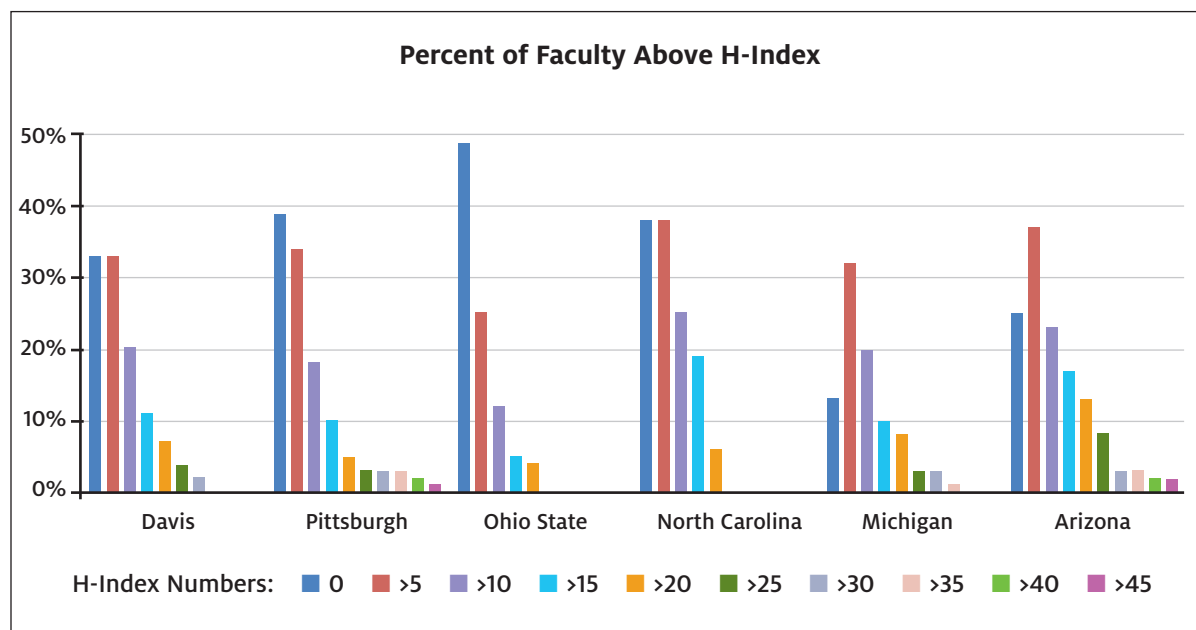
The Arizona Emergency Medicine Research Center (AEMRC) was created in 1990 as an Arizona Board of Regents (ABOR)-approved center of excellence. With divisions in Tucson and Phoenix, AEMRC has established itself as a statewide research center with a strong presence in prehospital implementation studies and clinical translational research.

With AEMRC, the department has established one of the most respected research records in the specialty, currently ranking 18th in National Institutes of Health (NIH) funding for academic emergency medicine departments (see **APPENDIX H**). Milestone achievements have been made through our research in prehospital care, cardiac arrest, trauma resuscitation, airway management, medical education, medical toxicology, emergency bedside ultrasound and pediatric emergency medicine.

B.2. Major Goals and Strategic Plan

The strategic focus of the department aligns with Banner Health to achieve excellence in patient care and translational research. The department collaborates with Banner – University Medicine leadership to advance the operational efficiency and quality of patient care, to advance the educational mission through support of Accreditation Council for Graduate Medical Education (ACGME) programs and to advance research in the emergency department by partnering and providing infrastructure for clinical trial enrollments.

The department's top three infrastructure priorities are:
- **Clinical Research Enrollment Infrastructure.** Optimize clinical trials enrollment in the emergency department.
- **B-UMCT Emergency Department Front-end Remodel.** Optimize patient care environment for Rapid Medical Evaluation (RME) and Fast Track operations. The RME program puts a physician in triage to rapidly evaluate patients upon presentation and assign an acuity level and appropriate treatment area within the emergency department. The RME physician orders diagnostic tests on patients at the front end so that results are available when patients are placed in the appropriate

treatment area to be seen by a provider. Higher acuity patients are sent to the main emergency department to be seen by emergency medicine attending physicians and residents. Lower acuity patients go to Fast Track and are seen by nurse practitioners (NPs). Patients evaluated with intermediate acuity are sent to a medium acuity area staffed by both attending physicians and NPs. RME and Fast Track allows patients to be seen as quickly as appropriate for their injury or illness and not have to wait behind the higher acuity patients. Currently, space for these programs is grossly inadequate.

- **Academic Protected Time.** Gain more protected time for junior faculty educators and physician scientists to pursue and be successful in scholarly production and extramural grant support. Currently, funding is not optimal for graduate medical education core faculty and undergraduate medical education key teaching roles.

Current strategic initiatives for the department in FY 2017 and beyond include:

- **Implementing the Banner Physician Compensation Plan beginning July 2017, with a shadow period that started July 2016, involving extensive modeling to gauge impact.** Department chair Dr. Samuel Keim serves as co-chair of the Banner Compensation Committee leading this effort. We expect the plan's implementation to result in significant improvement to our faculty's reimbursement over the next three years to match our high relative value units (RVU) productivity.
- **Continuing to advance emergency department operational efficiency and quality of care.** We launched a second rapid medical evaluation (RME) shift in July 2016, which provides 18 hours a day of front-end physician coverage to quickly assess patient acuity and assign proper utilization areas, as well as start orders on patients as they present. **FIGURE B.2.** demonstrates how the RME program has resulted in a significant reduction in our rate of patients leaving without being seen (LWBS), from more than 6 percent down to our current 2-3 percent.

FIGURE B.2. RME Results
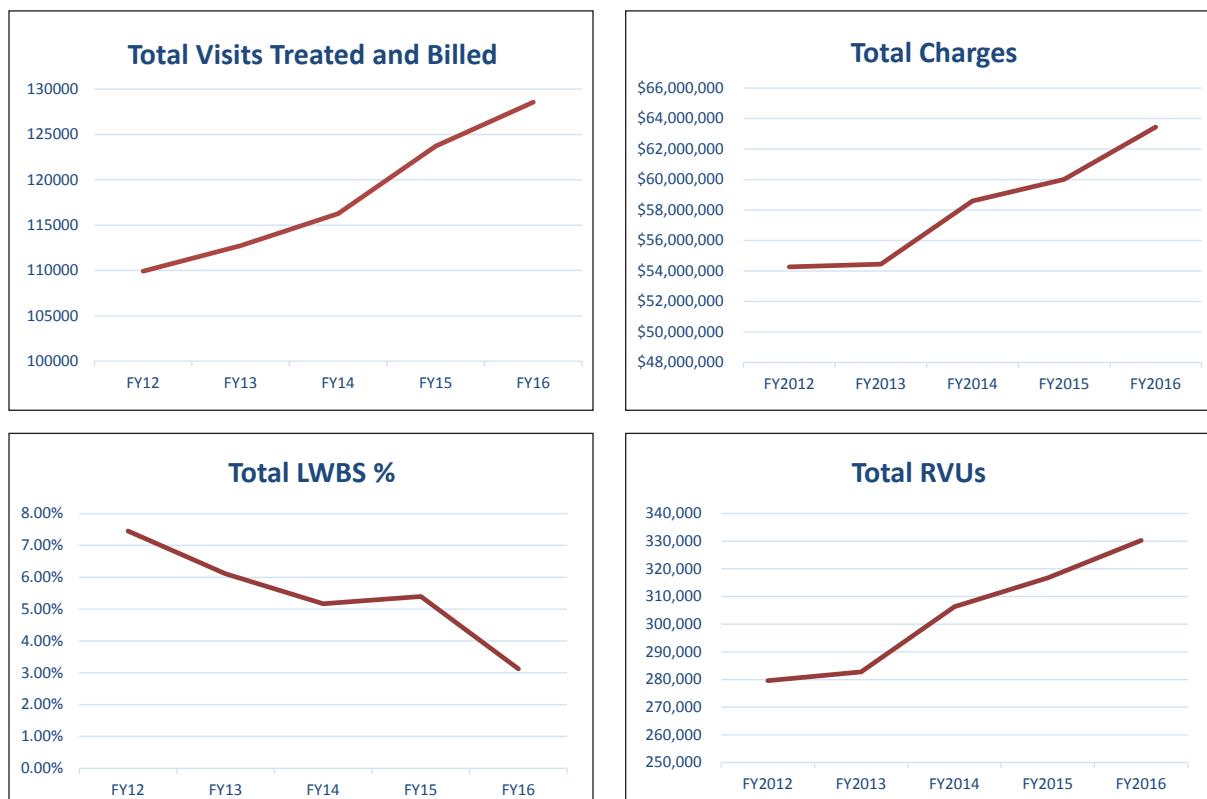
- **Joining a consortium of leading emergency medicine research departments to win the new NIH-sponsored Strategies to Innovate Emergency Care Clinical Trials Network (SIREN) Emergency Medicine Research Award and serve as a regional hub.** We will continue collaborating with the University of Arizona Health Sciences (UAHS) and the College of Medicine to manage clinical trials research enrollments in the emergency department. We also are initiating a new post-doctoral research fellowship.
- **Continuing our coding review initiative using experts from the American College of Emergency Medicine Physicians (ACEP) to diagnose coding deficiencies and retrain coders.** This review found "severe undervaluing of physician effort" by the Banner coders due to lack of knowledge of emergency medicine specialty coding. Coders attended a full-day retraining workshop to more accurately interpret the severity of patient acuity and the complexity of physician work, and to assign the proper evaluation and management code. Initial results show improved accuracy in evaluation and management (E&M) code selection. We also continually educate physicians to document according to Centers for Medicare & Medicaid Services (CMS) guidelines. We already are at the 70th percentile of RVU productivity on the national Faculty Practice Solutions Center (FPSC) benchmark, and with the correction of downcoding, we will move toward the 90th percentile.
- **Launching an improvement plan targeting the subpar collection performance of the Professional Business Office (PBO).** The PBO currently achieves only a 22 percent adjusted gross collection rate (AGCR) versus the budgeted 29 percent. This represents an annual gap of $3.4M in professional fees left on the table. Banner leadership has approved the hiring of a reimbursement specialist and we are now working with the PBO and with Hospital Contracting to identify opportunities and initiatives to improve collections.

B.3. Alignment with UA Never Settle Strategic Plan

The department is aligned with the UA Never Settle Strategic Academic and Business Plan by:
- Conducting cross-cutting clinical translational research in the following interdisciplinary areas:
  1) Emergency neurology, stroke
  2) Traumatic brain injury (TBI), headache
  3) Emergency trauma
  4) Prehospital treatment of cardiac arrest and traumatic brain injury
- Focusing research studies on discovery and application of time-critical diagnostics, decision-making and treatments that save lives, prevent or reduce disability and restore human health to populations throughout Arizona and the nation.
- Implementing Responsibility Centered Management (RCM) with fulfillment of high standards of accountability in revenue growth, documentation excellence and RVU productivity. Census and revenue continue to grow by 3 percent annually, and RVU productivity remains above the 70th percentile of the national benchmark by Vizient Faculty Practice Solution Center.

Department History

Photo by UAHS BioCommunications

C. DEPARTMENT HISTORY

C.1. History and Major Changes Since Last APR

In 2011, Dr. Harvey Meislin stepped down as department chair, after serving 30 years as the leader of emergency medicine at the University of Arizona. Dr. Samuel Keim was appointed interim chair (head) in 2011, and permanent chair (head) in 2012. Successful succession planning and change management included three years of close mentoring of Dr. Keim as the vice chair and 12 years as associate head for academic affairs prior to the transition. Dr. Albert Fiorello was appointed residency program director at the categorical Tucson Program after serving as associate residency director for seven years.

Major initiatives or administrative changes instituted by Dr. Keim (since 2011) include:
- Forming an 11-member Leadership Council in 2011 that brings broad expertise and connection to faculty and trainees.
- Implementing an annual goal and strategy setting process to provide faculty input on annual and long-term goals in all major missions. The process includes supported mission-based mini-retreats leading to an annual leadership retreat.
- Creating an annual roadmap and annual evaluation process. All faculty members meet with Dr. Keim to discuss annual reviews conducted by the peer review committee and to chart future development.
- Establishing an Office of Faculty Mentoring and Development led by tenured professor Dr. Frank Walter and supported by administrative staff to fully assist with faculty promotional activities, monitor and promote mentoring relationships and organize a faculty development lecture series. Dr. Walter also chairs the department's Promotion and Tenure Committee. Over the last seven years, 19 faculty members have been promoted in rank.
- Appointing academic physicians to lead new department sections, divisions or programs in Critical Care Medicine, Emergency Ultrasound, Medical Simulation, Clinical Informatics, Prehospital Implementation Research, Global Health, Biostatistics and Hospice & Palliative Medicine.
- Recruiting a full-time PhD-level epidemiologist to support faculty research and to lead the residency research curriculum, ScholarQuest.
- Implementing a new physician compensation plan under Banner – University Medical Group to better link clinical productivity to faculty compensation while promoting academic success.
- Developing a new comprehensive communication plan that includes an electronic newsletter, electronic updates, web intranet, academic secure social media platform (Convo) and physician liaison champions.
- Developing a program that includes a development officer, an advisory board, alumni outreach strategies and an annual alumni social event. Our first Department of Emergency Medicine Residency Program Alumni Reunion, held spring 2012, included faculty lectures on airway management and emergency department point-of-care ultrasound.
- Supporting specialization in clinical informatics. Drs. Lisa Chan and Kevin Reilly led the development of a medical informatics fellowship, which graduated its first fellow in 2016. Their training and expertise allowed for our department's smooth transition to the implementation of the hospital's electronic health record software, Epic, and continued innovation with the use of electronic medical records.

Moving into Two New Physical Spaces

In 2009, the current emergency department at Banner – University Medical Center Tucson (B-UMCT), then called University Medical Center (UMC), opened with a doubling of patient care space. The new emergency department included 61 private rooms, a separate pediatric emergency department, enhanced physician clinical and teaching space and enhanced resuscitation space.

In 2011, the current Banner – University Medical Center South (B-UMCS) Emergency Department, then called University Medical Center (UMC) South Campus, opened with a doubling of patient care space. The new emergency department included more than 50 private rooms, a separate secure behavioral emergency department area, enhanced physician clinical and teaching space and a separate Fast Track area.

Patient volumes grew and quickly consumed the additional space made available by these newly constructed locations. "Left Without Being Seen" (LWBS) rates increased again, and by 2011 exceeded 10 percent at both sites. As previously mentioned in Section B.2., the department implemented an innovative Rapid Medical Evaluation (RME) initiative, funded mostly by the hospitals, which put attending physicians at triage to facilitate split-flow and early order entry, and decreased LWBS rates to less than 4 percent.

Pediatric emergency medicine thrives in the only pediatric emergency department in the Tucson metropolitan area that is staffed with double board-certified pediatric emergency medicine physicians. This allows the combined residency and academic research programs related to pediatric emergency medicine to flourish.

UPH and UMC Merges to UAHN
The University Physicians Healthcare (UPH) practice plan and University Medical Center (UMC) hospital merged to form the University of Arizona Health Network (UAHN) in 2010. The formation of UAHN allowed for improved alignment of hospital and physician strategic planning. UAHN seated a new corporate board filled entirely from national searches. In 2013, the corporate board recruited a new CEO, Dr. Michael Waldrum, who later partnered with the president of the University of Arizona to negotiate the 2015 merger/acquisition with Banner Health.

Banner Acquisition
Banner Health acquired UAHN in March 2015 and created a 30-year Affiliation Agreement with the University of Arizona. The agreement includes the formation of an Academic Management Council to oversee operations within the Banner – University Medicine, the primary clinical partner for the UA. The agreement also includes commitments by Banner Health to construct a major hospital addition ($450M), an Academic Enrichment Fund endowment ($300M), a new physician compensation plan and capital improvements to the existing clinical environment.

Faculty Growth
As previously mentioned in Section A.2., the number of the department's faculty members has nearly doubled since 2009 (**FIGURE A.1.**). New faculty have added subspecialty expertise in Emergency Ultrasound, Medical Simulation, Pediatric Emergency Medicine, Sports Medicine, Critical Care Medicine, Emergency Medical Services, Medical Toxicology and Hospice & Palliative Medicine. These subspecialists have developed new programs of clinical and academic excellence that did not exist at the time of our last APR.

Residency Growth
A new categorical residency was approved at the University of Arizona Medical Center South Campus (now Banner – University Medical Center South) in a status of initial accreditation in July 2009. The first class started in July 2010 with 10 slots approved for year one only, and six slots ongoing for the three-year program. This program was developed to add unique training goals related to underserved care, rural and global health and a focused medical Spanish curriculum. The University of Arizona College of Medicine at South Campus Program has grown to 18 residents.

Since the last APR, the University of Arizona College of Medicine Combined Emergency Medicine/ Pediatrics Program (established in 2005) has grown from 10 residents in 2009 to a total of 15. Overall, the department currently trains 78 emergency medicine categorical residents.

New Fellowships
Seven new fellowships have been developed since the last APR and all are aligned with the growth of subspecialties within the department, (shown in **TABLE I.11**). These fellowships allow the department to play a pivotal role in the growth of these subspecialties nationally as we train the future providers and leaders.

Expansion of Subspecialty Areas
Substantial growth has occurred in all subspecialty areas since the last APR, but most notably within:
- **Pediatric Emergency Medicine.** The opening of a new pediatric emergency department and growth of the combined five-year University of Arizona College of Medicine Combined Emergency Medicine/Pediatrics Program coincided with the addition of two double board-certified faculty members (from six to our current eight). This group also includes two faculty members with additional subspecialty fellowships beyond EM/Peds: Critical Care (Dr. Jenny Mendelson) and Emergency Ultrasound (Dr. Lucas Friedman).
- **Critical Care Medicine.** We now have three faculty members who have completed fellowships and are American Board of Medical Specialties (ABMS)-certified in Critical Care Medicine (Drs. Jarrod Mosier, Cameron Hypes, Lawrence DeLuca). This is sufficient critical mass for our two Critical Care Medicine fellows, but insufficient to meet the clinical and academic demands of our vision to better streamline and integrate the care of critically ill patients from prehospital interactions through hospital discharge.
- **Emergency Ultrasound.** The department's Emergency Ultrasound Program is one of the top academic ultrasound programs in the country, and we are proud to have achieved this in a relatively short period. Dr. Srikar Adhikari has led a remarkable evolution that includes medical center physician credentialing, strong Department of Medical Imaging collaboration, high academic productivity, and educational programs that touch preclinical medical students, a broad spectrum of residents from many programs, and faculty from inside and outside our department.

Expansion of Research Enterprise
Two significant areas of research have been successfully launched since the last APR:
- The Prehospital Implementation Research Program, led by Drs. Daniel Spaite and Bentley Bobrow, has gained international respect with top awards in 2015 and 2016 at national (NAEMSP) and international (AHA-ReSS) meetings for leading innovations in cardiac arrest and traumatic brain injury.
- The Clinical and Translational Research Program, led by Dr. Kurt Denninghoff, a pioneer in innovative clinical research infrastructure, has become part of national research networks, such as the Pediatric Emergency Care Applied Research Network (PECARN).

Other areas of expansion since the last APR include the successful development and deployment of the following research programs:
- **ScholarQuest.** This research program led by research faculty member Dr. Tomas Nuño provides an integrated research curriculum built into all three categorical residencies. All residents are expected to participate in original research through this program mentored by department faculty.
- **Arizona EM Clinician Scientist Program.** The two-year faculty development program includes graduate coursework in biostatistics, epidemiology, mentored research and research ethics, as well as mentored original research.
- **Biostatistics Core.** The department employs two biostatisticians (Drs. Tomas Nuño and Chengcheng Hu) who support faculty and resident research.
- **AEMRC.** The Arizona Emergency Medicine Research Center leverages opportunities from the departmental infrastructure (accounting, biostatistics, administrative leadership), as well as the research offices of the two Colleges of Medicine and the UA Health Sciences, to accomplish nationally and internationally recognized research. In 2011, two arms (Tucson and Phoenix) of AEMRC were created to allow programmatic evolution to accelerate.

Expansion of Undergraduate Medical Education

- **Emergency Medicine/Critical Care Rotation.** Voted the most popular rotation in the fourth year, the Emergency Medicine/Critical Care Rotation led by Dr. Katherine Hiller engages all faculty and nearly all medical students.
- **Societies Mentors.** Currently four emergency medicine faculty members serve as College of Medicine Societies Mentors. Societies Mentors become close to their assigned students over the course of their four years together, giving students a great opportunity to learn about emergency medicine and the unique characteristics of our faculty.
- **Block and Thread Directors.** Currently three emergency medicine faculty members serve as College of Medicine Block and Thread Directors. These faculty members play major roles in the design, implementation and assessment of the college's curriculum.
- **Dean's Office.** Dr. Richard Amini serves as assistant dean for Medical Student Affairs, as well the thread director for Evidence-Based Decision Making.

C.2. 2009 APR Recommendations and Responses

Clinical

Develop a specific plan to address issues with extended lengths of stays, boarding of admitted patients and patients leaving without being seen. Align hospital incentives to improve throughput benchmarks. Adapt clinical environment to address areas of concern: resident and faculty staffing levels, development of new processes and management of the new clinical space. Develop clear transfer guidelines defining the acceptable length of time before bed availability and involvement of the accepting inpatient team for care of patients boarded in the emergency department.

Multiple strategies and projects have been developed to decrease patient wait times and to provide excellent care to all patients who present to our emergency department. All efforts have led to a two-hour (average) decrease in length of stay, a more than 8 percent increase in patient volume and a more than 30 percent decrease in patients leaving the emergency department without evaluation. We anticipate these efforts, in addition to new workflow redesign, will help reach our throughput goal of under four hours for emergency department patients. These strategies and projects include:

- **Adopting a more efficient admissions process.** The Banner admission process is significantly more efficient than the UAHN process. Much time and effort has been put towards mirroring the Banner admission process. A "potential for admit" notification was added to alert case management and patient placement of an anticipated admission and allow them to do their work prior to the writing of admission orders. Emergency physicians are authorized to write the admit order if the admitting service is unable to do so within 15 minutes of the conversation with the medicine captain. Early involvement of case managers in the admission process has been accomplished and faster assignment of beds after entry of the admit order has been achieved. Prior to Banner, the average time was more than two hours; now it is 30 minutes. Continued compliance with implemented steps of the admission process is necessary. The order to admit patients is occurring with Internal Medicine. The same needs to occur with all services.
- **Rounding on patients with long emergency department stays.** Rounding on patients with long emergency department stays is needed to find out why the lengthy stay occurred and to create a solution to move the patient to the next service location or discharge.
- **Encouraging more attending-to-attending communication.** The culture has been patient-care communication by residents; however, this method is not always effective since residents are still in training and are not fully responsible for the patient. Attending-to-attending communication is necessary when there is a disagreement and when patient care is at stake. It also is necessary to improve camaraderie.
- **Improving the consult process.** Long wait times for consult initiation and completion have been problematic. Progress in this area has been made by the development of a defined time for consult completion in the hospital bylaws, as well as creation of a report showing consult completion metrics. Ongoing accountability and appropriate use of consults in the emergency department is necessary. Consults that can be done in the inpatient setting should be allowed to occur at that

time. Per bylaws, the consult should be completed by two hours, but most services achieve this target less than 20 percent of the time.

- **Creating Rapid Medical Evaluation (RME).** At RME, a physician, nurse and technician begin patient evaluation and management when the emergency department is full. Patient care can be started in the RME area and then continued in the main emergency department if more care is needed, or the patient can be evaluated and discharged from RME. Increased utilization of evaluation and discharge of low acuity patients in the RME area will improve throughput and patient satisfaction.

- **Developing a nurse practitioner program to staff the emergency department Fast Track process and the eight Fast Track patient rooms in the emergency department.** Nurse practitioners receive monthly didactics, as well as an annual full-day education retreat. Recently graduated nurse practitioners also receive mentoring while doing clinical work.

- **Working with physician resources and hospital leadership to have outside transfer patients needing admission go to inpatient units instead of the emergency department.** Progress in this area has been made, but services continue to send patients requiring admission to the emergency department instead of an inpatient unit.

- **Creating a report showing individual emergency department attending physician throughput times.** Decreasing emergency department throughput time has been added to the Banner Strategic Initiative and now is a major performance metric. Emergency department throughput time directly affects the number of staff hired. Often patients have inappropriately long emergency department stays. Our physicians need to take more ownership of our patients and serve as their advocate. Attending-to-attending communication is needed to resolve issues that keep patients in the emergency department for long periods of time. Emergency department and hospital leadership must continue to solve the problems that lead to inappropriate long patient stays. Clinical incentives, as well as hospital management incentives, should be awarded to improve emergency department and inpatient throughput. The target emergency department length of stay for our patients is 240 minutes. Currently, our average emergency department length of stay for discharged and admitted patients is 333 minutes.

- **Developing meetings with medical imaging leadership to decrease time for imaging studies.** Targets have been defined for completion of medical imaging. Reports have been created on reaching targets and efforts need to continue to consistently meet targets.

- **Leveraging our electronic medical records (EMR) to enhance clinical workflow and documentation completion and to meet regulatory requirements.** The B-UMCT transition from the Epic to the Cerner EMR system is scheduled to go live June 2017. Emergency medicine clinical informatics specialty physicians are leading the Cerner team to convert the clinical EMR system. They are uniquely positioned to adopt the Cerner system to fit well with emergency department clinical work flow and physician duties, such as chart documentation.

- **Developing architectural plans to remodel emergency department triage, Fast Track and waiting room.** Much time and effort was spent on planning the emergency department front-end expansion. However, because of financial concerns, the project was halted. Currently, patients are seen in space that was not designed for patient care. Obviously, this project should continue and finish as soon as the financial situation improves.

- **Staffing to demand a work in progress.** Nursing leadership continues to struggle with providing adequate staffing in the emergency department. Challenges include a competitive nursing market and nursing productivity allowance constraints. In order to have an adequate number of staff, each room needs to turn over once every four hours. Patients with long stays are cared for by nursing, but the nurses do not receive credit for the hours beyond the four-hour target. Therefore, the number of staff allowed decreases even though required work still is done by the nurse. Physician schedules have been adjusted to accommodate the increasing volume by extending the RME hours. RME opens an hour earlier and closes two hours later.

- **Obtaining outpatient appointments for our patients.** In order to obtain better follow up for our emergency department patients, the golden and silver ticket system was developed to obtain appointments by three and 21 days, respectively. However, the next available appointments

- **Obtaining outpatient appointments for our patients.** In order to obtain better follow up for our emergency department patients, the golden and silver ticket system was developed to obtain appointments by three and 21 days, respectively. However, the next available appointments often extend beyond these target times. We are working on a system that will allow emergency department discharged patients to obtain follow up more easily.

Including emergency medicine in trauma center funding.
The only trauma center funding that comes to the emergency department is for medical director support for both hospital sites.

Providing hospital programmatic support for the extensive clinical service to the institution.
Banner has a standardized approach to medical director support, which is substantially less than we experienced historically (cut by 50 percent in 2016 as part of hospital-wide austerity plan). This decrease in support must be ratified, or a compromise found, to best serve emergency department patients and ensure physician tenure.

Modifying the department's mission statement to reflect its comprehensive outreach activities.
The department's mission statement as stated in Section B: "The department strives to become the benchmark by which others measure excellence by providing excellent medical care, innovative and effective learning programs, as well as world class original research." Outreach to the local community and the specialty indeed has been one of the great achievements of this department and should reflect our mission, vision and strategic planning. Outreach now is a key topic for department leaders for their annual retreats. The department established a Development Advisory Board that is planning outreach activities as well.

Academic
Obtaining additional resources from the College of Medicine to the department commensurate with the clerkship teaching service load.
The college has distributed substantial new resources to the department over the last seven years consistent with the dramatically increased engagement of department faculty with the preclinical curriculum. The department is seeking an increase in reimbursement for the senior year required rotation that is fair and consistent with other required rotations.

Increasing hospital support for residency expansion and for assisting the department to meet physician staffing needs.
The graduate medical education (GME) programs have expanded significantly over the last seven years. GME funding for general residency expenses (non-salary budget items), as well as required Core Faculty time, is still unclear and insufficient.

Developing a formula to use state funds for participation in preclinical and clinical teaching.
A College of Medicine formula was developed for distribution of state funds for teaching efforts, and this has partially funded emergency medicine faculty teaching time. A new curriculum for medical education is now planned for July 2017 and it is unclear how teaching will be funded.

Research
Improving department research space.
A substantial increase in research space has been allocated to the department, but it is not high-quality space. All of the Tucson space is at risk because of the upcoming destruction of our current space as part of the new hospital construction project. We are concerned by the centralization of research space allocation to the UA Health Sciences from the College of Medicine might disadvantage the department.

Obtaining additional university support to achieve the goal of becoming a top-10 NIH department.
The department needs stimulus support to maintain current research productivity and foster new research. A proposal currently is being considered by the College of Medicine and UA Health Sciences leaders.

Administrative
Addressing the occasionally dysfunctional relationship between UMC, COM and UPH.
The acquisition of UAHN (UMC + UPH) by Banner Health has dissolved the chaos of three entities trying to work in alignment. A common board (Academic Management Council) with representatives from UA and Banner conducts oversight of the medical center.

Appointing the department chair a permanent practice plan board member.
Many changes have occurred in the last seven years, including the appointment of a new permanent College of Medicine dean, who is an emergency physician. Currently, there is a governing council of chairs rather than a practice plan board.

Aggressively pursuing hiring a department administrator.
The department was successful in recruiting one of the top administrators in the country, Dale Borgeson, MBA.

Once hired, the administrator should analyze administrative support needs of the department. The department now has a great deal of strength in this area with a veteran top administrator and strong analysis support (Gregg Stowe) and business office leadership (Toni Richardson).
Increasing emphasis on communication of financial information to the faculty. Financial reports now go to faculty each month with extensive detail.

Increasing emphasis on communication of financial information to the faculty.
Financial reports now go to faculty each month with extensive detail.

Consolidating department faculty in one geographical location.
It is essential that the department's offices remain in the UA Health Sciences complex so that our faculty can walk between clinical, research and teaching responsibilities. There currently is a space request to UA Health Sciences leadership.

Developing a comprehensive communication plan.
The department developed a communication plan in 2012 that includes a substantially enhanced website with intranet, chair updates, newsletters, full-time news and communications staff, clinical champions and monthly reports on faculty finances and clinical performance.

Reinstituting annual administrative staff evaluations.
The department has instituted annual administrative evaluations. Staff members are led by department administrator, Dale Borgeson.

Department
Quality Overview

Photo by Kevin Reilly, MD

D. DEPARTMENT QUALITY OVERVIEW

D.1. Department Reputation and Outcome Indicators
The reputation of the Department of Emergency Medicine faculty is based on outstanding research performances, quality of patient care, quality of teaching and outreach.

Major Faculty Accomplishments, Honors and Awards
Many of the department's faculty members have been recognized as Best Doctors in America® for outstanding leadership in their fields, for excellence in teaching and for best scientific presentations at national meetings. Faculty members have been honored with Lifetime Achievement Awards, National Clinical Trials of the Year Awards and the Public Health Service Award. Four faculty members hold endowed chairs or distinguished professorships. **APPENDIX C** lists faculty honors and awards for 2010-2016. No national or international ranking system currently exists for emergency medicine; *US News & World Report* does not rank emergency medicine programs.

D.2. Comparison to Top Five Public Peer Institutions
We selected the following five aspirational peer emergency medicine programs for comparison:
1. University of California, Davis
2. University of Pittsburgh
3. University of Michigan
4. The Ohio State University
5. University of North Carolina

The data used for comparison was gathered from online data sources, the Society for Academic Emergency Medicine's (SAEM) annual administrator's survey and a questionnaire sent to the departments' chairs from the five programs. Two of the chairs chose not to participate in the self-study questionnaire (Michigan and UC Davis) and two of the programs did not participate in the SAEM survey (University of North Carolina and University of Pittsburgh). Comparison was made between the groups within the spheres of research, service and education.

SAEM created a voluntary, comprehensive database of 276 objective emergency department data from 90 academic emergency departments that provides a platform of comparison. The UA Department of Emergency Medicine at Banner – University Medical Center was compared to the 32 other primary academic departments.

Clinical
The 2015 total patient volume of the two emergency departments under our control is 130,686, placing us with the largest census in our SAEM cohort. The Banner – University Medical Center Tucson (B-UMCT) emergency department admits 55.8 percent of hospital admissions, which is above the 75th percentile for the group, but admits only 21.9 percent of patients seen. B-UMCT and B-UMCS emergency departments have more EMS visits (29,938) than all other groups reporting data. Our census of >65 age group places us as 39th of 43 centers in the group, making our population one of the oldest. A combined pediatric census of 26,557 gives us the youngest group, by far, in pediatric visits. This mix of patients provides our department an excellent milieu for education and research.

As seen in **TABLE D.1.**, clinical revenue realized from patient care at the two sites nets $14,318,333. Prior to July 2014, the department benefitted from managing our own coding and reimbursement staff. Following the Banner Health acquisition, our coding staff was assimilated centrally by a Banner Coding Alliance. Since this time, we have experienced significant under-coding of our documented encounters. Despite having triage acuity greater than the mean at B-UMCT, we suffer some of the lowest evaluation and management codes (E&M codes) among the group at 18.5 percent for B-UMCT and 14.0 percent for B-UMCS, placing us below the 25th percentile. Ultrasound and EKG billing also have taken a significant

decline over this period. The base clinical expectation of the faculty is 1,440 hours per year, which puts our group at the 75th percentile among our peers and well above the mean of 1,411 hours per year for the group.

TABLE D.1. Clinical Productivity

Clinical Productivity							
	Michigan	UNC	Ohio State	UC Davis	Pittsburgh	Arizona	SAEM Average
2015 Revenue	$12,199,559	No Data	$9,731,344	$8,161,850	No Data	$14,318,333	No Data
2015 ED Visits	105,000	66,839	127,000	68,425	No Data	130,686	67,631
Base Clinical	1,152	No Data	1,474	1,528	No Data	1,536	1,411

Education

Residency Programs. The department hosts three separate residency programs: University of Arizona College of Medicine – Tucson Program, University of Arizona College of Medicine at South Campus Program and University of Arizona College of Medicine Combined Emergency Medicine/Pediatrics Program. The two emergency medicine categorical residency programs were developed with different missions. The long-standing University of Arizona College of Medicine – Tucson Program traditionally focuses residents toward an academic career. The University of Arizona College of Medicine at South Campus Program mission is focused on health disparities, global/rural health and meeting the needs of the primary Spanish speaking community of southern Arizona. The University of Arizona College of Medicine Combined Emergency Medicine/Pediatrics Program was the fourth to be established in the nation. This five-year training program prepares residents to be eligible for both board exams and seeks to create leaders in pediatric emergency care. Many of this residency's graduates have joined our faculty, sought additional training or have taken leadership roles with other local emergency departments. **TABLE D.2.** shows our programs graduate a larger number of emergency medicine-trained residents than our peer group. More details about other residency programs can be found in Section I.

TABLE D.2. Peer Comparison of Residency Programs: Total Residents in Training

Residency Programs - Residents Accepted Per Year						
	Michigan	UNC	Ohio State	UC Davis	Pittsburgh	UA
Residency 1 Total Residents	64	30	48	42	48	48
Residency 2 Total Residents			10			15
Residency 3 Total Residents						18

Fellowship Programs. We have created a blend of one- and two-year learning opportunities for residents from our residencies and from programs across the country. An important extension of the department's commitment to education, fellowship programs aim to extend our trainees' acumen, broadening their body of specialty knowledge and bringing specialty knowledge to the bedside to improve patient care.

The relatively young specialty of emergency medicine has few ACGME-approved fellowships, but programs have been created to provide opportunities for trainees to focus on important portions of our specialty. In comparison with our aspirational peer groups, **TABLE D.3.** shows how our department

compares positively in the depth of fellowship offerings. Our department continues to explore partnerships with other UA departments to meet the needs of a rapidly changing specialty, enhance the base of knowledge and provide better care to our community, the nation and the world. See Section I for more information about our fellowship programs

TABLE D.3. Peer Comparison of Fellowships

Fellowship Training (new fellows accepted annually)						
	Michigan	UNC	Ohio State	UC Davis	Pittsburgh	UA
EMS*		2	1		2	2
Toxicology*			2	1	2	1
Ultrasound	2		3	1		3
Critical Care*	2					1
Clinical Informatics*						1
Research	varies	1	1	1	1	1
Global Health		1	1			
Simulation				1		1
Sports Medicine*						1
Geriatrics		1		1		
Administration		1	1			
Education	1	1		1		
Peds/EM*	3					
Oncology/EM			1			
Health Policy				1		
Total Fellows	8+	7	10		5	11
* ACGME approved						

Students. Henry B. Adams said, "A teacher affects eternity; he can never tell where his influence stops." Hiring those who can teach is of utmost importance to the department. Over the past seven years, many of our faculty members have sought out opportunities to teach and mentor medical students in the College of Medicine, undergraduate students at the University of Arizona and allied health professionals at the university and local colleges. Section H describes in detail the department's undergraduate and graduate programs. **TABLE D.4.** compares the number of medical students enrolled in 2015.

TABLE D.4. Comparison of Medical Student Enrollment

Medical Students Enrolled in AY 2015						
	Michigan	UNC	Ohio State	UC Davis	Pittsburgh	Arizona
Medical Student Clerkship	152	180	200	No Data	No Data	73
Acting Internship		50		No Data	No Data	17
Student Research	3-5	6		No Data	No Data	4
Independent Study		2		No Data	No Data	NA
Ultrasound	12	2	12	No Data	No Data	5
Subspecialties[a]		10		No Data	No Data	27
Advanced Topics[b]			1	No Data	No Data	78
EMS[c]		6		No Data	No Data	36
Global Health		2		No Data	No Data	NA

[a] UA Subspecialties include Toxicology, Wilderness Medicine, third-year year EM elective
[b] Advanced Topics include Cardiopulmonary Resuscitation Instruction Parts 1 & 2
[c] EMS = Undergraduate Emergency Medical Services

Research

The department's active research program has continued to grow since the last APR. Distribution of NIH grant dollars marks a program's success at developing a robust research program. Innovative research leaders create connections, which enable research programs to tackle the difficult questions of modern medicine. In the Society for Academic Emergency Medicine (SAEM) database, our program compares favorably with the other top academic state emergency medicine programs **(TABLE D.5.)**. Compared to two of our aspirational peers that have mature research programs, Michigan and Pittsburgh, we fall short of being a top emergency medicine research center. However, our department is committed to growing our research program and the recent Pediatric Emergency Care Applied Research Network (PECARN) grant places us on a pathway of successful meaningful grant applications. Our research effort is at the 25th percentile at around 3.9 percent of total faculty effort dedicated to research. Total research expenses exceed $2M per year.

TABLE D.5. Comparison of Grant Activity and Publications (2015)

Grant Activity						
	Michigan[1]	UNC[1]	Ohio State[1]	UC Davis[2]	Pittsburgh[2]	UA[1]
2015 NIH Award	19,334,842	609,264	237,040	1,176,919	1,909,336	721,352
2015 State	62,089	739,483	5,800			
2015 Organization		206,047				
2015 Total Grants	21,603,293		264,688			2,248,134
Publications						
	Michigan	UNC	Ohio State		Pittsburgh	UA
2016	152	30	68		54	49
2015	75	33	50		98	100
2014	135	46	54			153
2013	83	53				54

[1] Survey completed by chair
[2] Blue Ridge Institute for Medical Research

Faculty

Talent, passion and drive, combined with robust organizational support, are the factors from which all advancement begins. Academic advancement, one of the barometers of department success, is based on improvements in service, clinical care, administration and research. Achievement fuels advancement. Our department's high percentage of professor-level faculty members puts us above the 75th percentile in the SAEM data collection and shows that our faculty actively seeks academic advancement **(TABLE D.6.).**

TABLE D.6. Comparison of Academic Rank (2016)

Academic Rank (Percentage)						
	Michigan	UNC	Ohio State	UC Davis	Pittsburgh	UA
Professor	6	8	9	31	16	19
Associate Professor	16	10	10	19	18	18
Assistant Professor	44	31	39	29	78	38
Instructor	22	5	0	0	22	0
Fellow	12	8	10	23	6	14

Faculty

Photo by UAHS BioCommunications

E. FACULTY

E.1. Titles, Administrative Roles, FTE Status

The Department of Emergency Medicine has 51 full-time and seven part-time faculty members and one emeritus. **FIGURE E.1.** breaks down faculty by academic rank. Approximately two-thirds (40) hold administrative positions. Many of these administrative positions are in clinical care and management, reflecting a commitment to a successful transition with Banner. Since emergency care often starts in the prehospital setting, many of our faculty members hold administrative positions that are deeply involved and engaged in the larger community emergency and critical care arena. For a list of the faculty, including academic and administrative titles and FTE status, see **APPENDIX D**.

FIGURE E.1. Faculty by Rank and FTE Status (2016)
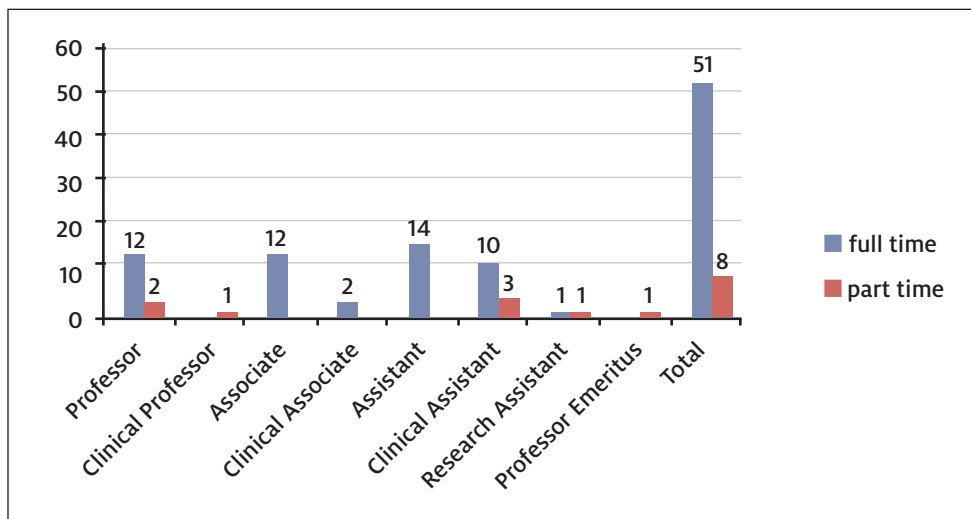
E.2. Research and Clinical Contributions

The department is particularly active in research that is inter- and intra-departmental in nature. As the department has grown, the resources devoted to research also have grown.

In addition to the well-developed clinical trials infrastructure that assists principal investigators (PIs) to perform studies in our hospital emergency departments, the department has two research personnel who are 100 percent dedicated to promoting departmental faculty and resident research in the emergency setting. Tomas Nuño, PhD, research assistant professor and director of Biostatistics and Epidemiology, leads this effort and is available to the entire faculty and residents to assist with study design. He has access to many national databases, which can serve as a resource for hypothesis training, and has a personal research portfolio focused on minority health issues and health disparities.

The department provides statistical expertise, personnel and computing resources to:
* facilitate study design and conduct data acquisition protocols, data analysis and the preparation of grants and manuscripts;
* adapt and develop new statistical methods to address emerging problems in science and medicine;
* raise the level of statistical practice through seminars, workshops and short courses; and
* foster discovery, translation and economic development by consulting with public and private organizations external to the UA.

The department also hired a full-time NIH-trained grant writer and research support coordinator whose contributions can be seen by the increase in Institutional Review Board (IRB) submissions in **FIGURE E.2.** (See **APPENDIX E** for *confidential* detailed list of the IRB submissions).

FIGURE E.2. IRB Submissions

Submissions to IRB 2011-2016

Year	Submissions
2011	6
2012	8
2013	9
2014	17
2015	18
2016	26
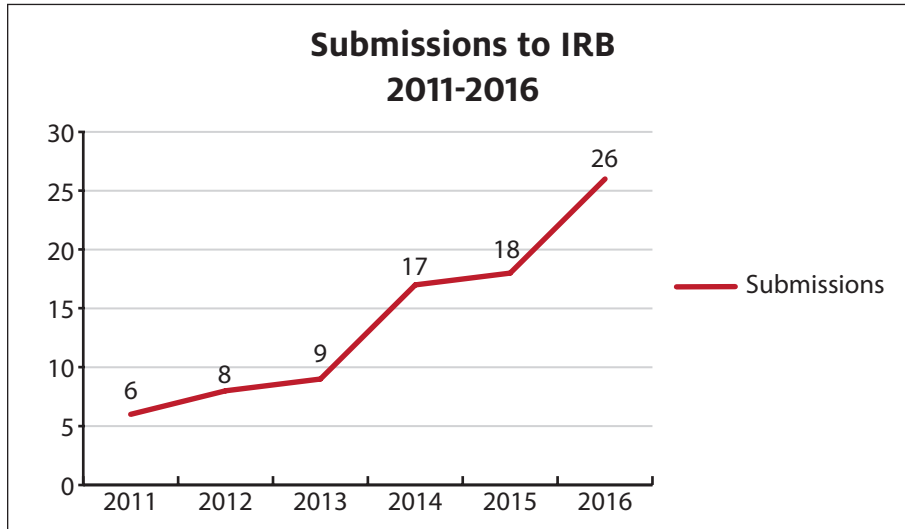
Department research has changed the practice of emergency medicine, particularly in the fields of cardiac arrest resuscitation, prehospital care and traumatic brain injury. Several department faculty members have served as medical directors of Arizona fire departments and assisted with the implementation of successful prehospital research findings and process improvements. One of our faculty, Dr. Bentley Bobrow, serves as the medical director for Arizona Department for Health Services EMS and Trauma Systems. This has allowed a unique opportunity to implement health-care policy. For out-of-hospital cardiac arrest, authoritative evidence-based recommendations have been made for regionalization of post-arrest care. Making these guidelines routine care and providing training has tripled cardiac arrest survival in Arizona.

Pioneering studies designed by department faculty to investigate the survival of patients with out-of-hospital cardiac arrest using compression-only cardiopulmonary resuscitation (COCPR) compared with conventional cardiopulmonary resuscitation (CPR), found that among patients with out-of-hospital cardiac arrest, layperson COCPR was associated with increased survival compared with conventional CPR and no bystander CPR. These studies and collaborations with Arizona EMS agencies have yielded many national and international awards.

Another department study investigated whether interruptions are detrimental to chest compression-generated blood flow during CPR. Data showed interruptions for mouth-to-mouth ventilation require a period of "rebuilding" of coronary perfusion pressure to obtain the level achieved before the interruption. Mouth-to-mouth ventilation performed by single layperson rescuer produces substantial interruptions in chest compression-supported circulation. COCPR produces greater neurologically normal 24-hour survival than standard CPR when performed in a clinically realistic fashion. The study found that any technique that minimizes lengthy interruptions of chest compressions during the first 10 to 15 minutes of basic life support should be given serious consideration in future efforts to improve outcome results from cardiac arrest.

Department faculty members formally collaborate with several states on the HeartRescue Project. This project coordinates public and professional education and training efforts by introducing and applying best-practice treatments to the general public, first responders (police and fire), EMS providers and hospitals. It allows for the implementation of a common, systemic method of measuring performance and outcomes of sudden cardiac arrest.

The Excellence in Prehospital Injury Care (EPIC) Project, which was funded by two NIH grants, validated the statewide implementation of the national EMS Traumatic Brain Injury Treatment Guidelines with before-and-after system evaluation. This project has influenced the care of more than 6,000 traumatic brain injury patients in Arizona since the implementation of the guidelines.

We serve as a regional hub for the NIH-funded Pediatric Emergency Care Applied Research Network (PECARN) clinical trials research. This network has conducted several projects that have changed clinical practice guidelines for children. Since our involvement in 2015, our hub presently is participating in six federally funded clinical trials.

Department faculty strives to increase its research efforts, particularly its funded research portfolio, to continue to foster an environment that leads to clinical practice-changing results. **FIGURE E.3.** illustrates the department's current IRB research status and sponsored projects. For a detailed list of sponsored or funded projects, see **APPENDIX F.**

FIGURE E.3. IRB and Sponsored Projects (2016)

IRB Research Status
70 current projects

- Exempt 57%
- Approved 23%
- No IRB Required 14%
- In Progress 6%

External (Non-UA) Sponsored Projects
Total $10.7M
2010-2016

- Funded $6,309,065.49
- Pending $2,404,272.80
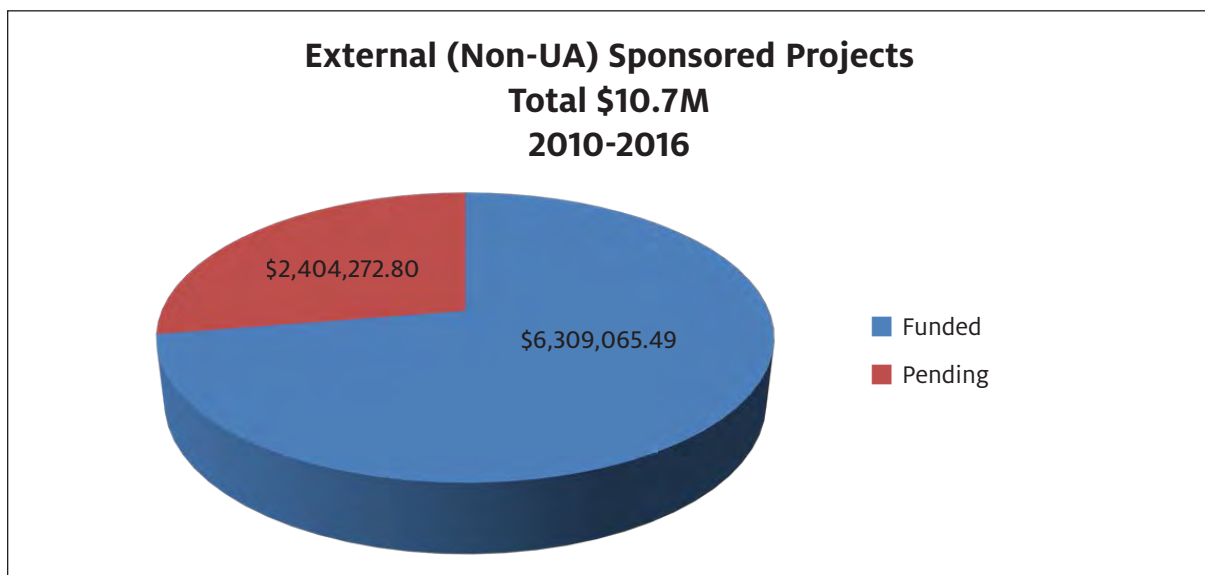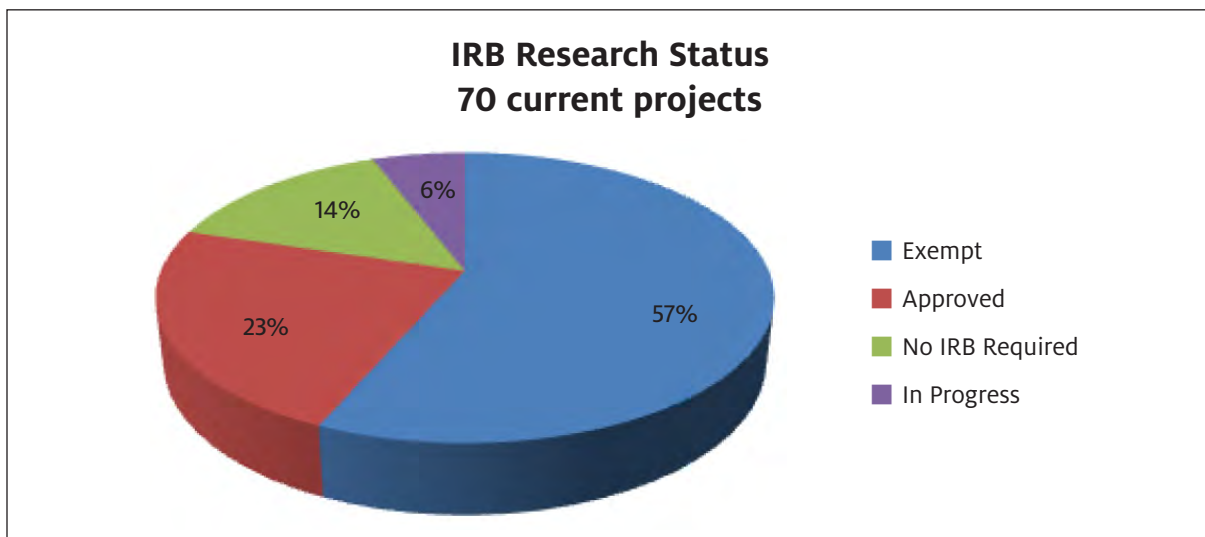
Balance in Research, Clinical Practice and Teaching Workload

The department actively seeks to advance the faculty's academic standing. Balancing research, education, clinical, service and administrative commitments is critical to faculty meeting their promotion goals. During the department's annual evaluation, faculty members assess their percentages of commitment to each of these spheres and create a roadmap for the next year on how they will meet their academic goals and progress toward promotion. Overall, our faculty members have heavy clinical commitments, with 54 percent of their work effort dedicated to direct patient care and a relatively limited 14 percent to research. This in large part mimics the funds flow to the department with a substantial part of our budget coming from clinical dollars. Currently, the department receives only 5 percent of aggregate clinical FTE support from the dean's Academic Enrichment Fund. We need closer to 10 percent to achieve our otherwise unfunded academic and professional service obligations. The department's goal is to increase the fraction of research support dollars to the 28 percent range. **TABLE E.1.** shows average faculty time allotment for clinical and academic activities. **APPENDIX G** details time allocations for each faculty member.

TABLE E.1. Average Faculty Time Allotment

Average Faculty Time Allotment (AY 2015)				
Education	Research	Service	Clinical	Administrative
13%	14%	6%	54%	13%

Research and Mentoring Environment

Research

Banner – University Medical Center Tucson and Banner – University Medical Center South hospitals serve as the primary teaching sites for the UA Colleges of Medicine, Nursing, Public Health and Pharmacy. Patient care at these sites involves 100 percent use of electronic medical records with automatic inter-hospital, inter-clinic and intra-department interfacing. The hospital complex has a long history of conducting patient care research in all clinical settings. Faculty members have the added benefits of proven success in multicenter emergency medical services research and access to a unique patient environment that includes Native Americans and rural settings. This provides access to patient populations that harbor disease processes exclusive to the border populations of the United States and Mexico.

In 2006, the NIH reported that the nation's emergency medical system was overburdened, underfunded and highly fragmented. However, the number of federally funded emergency medicine investigators remained low. The NIH organized three roundtables in 2009 to identify barriers, achievable goals and priorities to strengthen emergency care research. Barriers included a limited number of adequately trained investigators, poorly defined professional research tracks, limited interdisciplinary collaboration and limited funding streams**.** In spite of this challenging research environment, our department has made milestone achievements in prehospital care, cardiac arrest, trauma resuscitation, sepsis, medical education, medical toxicology, emergency bedside ultrasound, wilderness medicine and pediatric emergency medicine. Our department currently ranks 18th nationally for NIH funding (see **APPENDIX H**). **FIGURE E.4.** shows the number of the department's funded and sponsored projects by start date. **FIGURE E.5.** shows dollar amount of the department's funded and sponsored projects by start date.

FIGURE E.4. Number of Funded and Sponsored (Non-UA) Research Projects

Number of External, non-UA, Funded and Sponsored Projects by Start Date
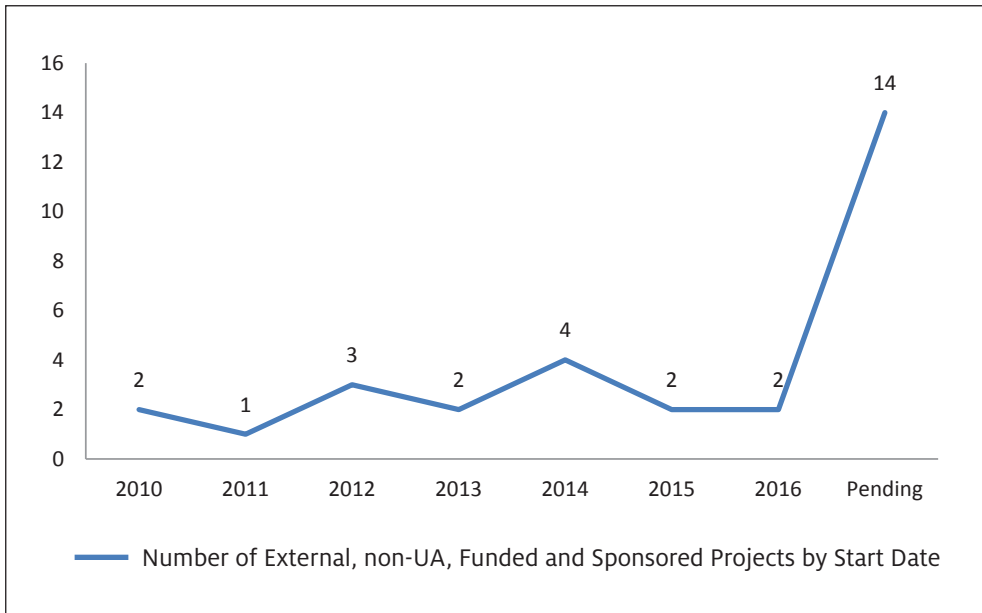
FIGURE E.5. Amount of Funded and Sponsored Non-UA Projects

Amount of Externally (non-UA) Funded and Sponsored Projects by Start Date
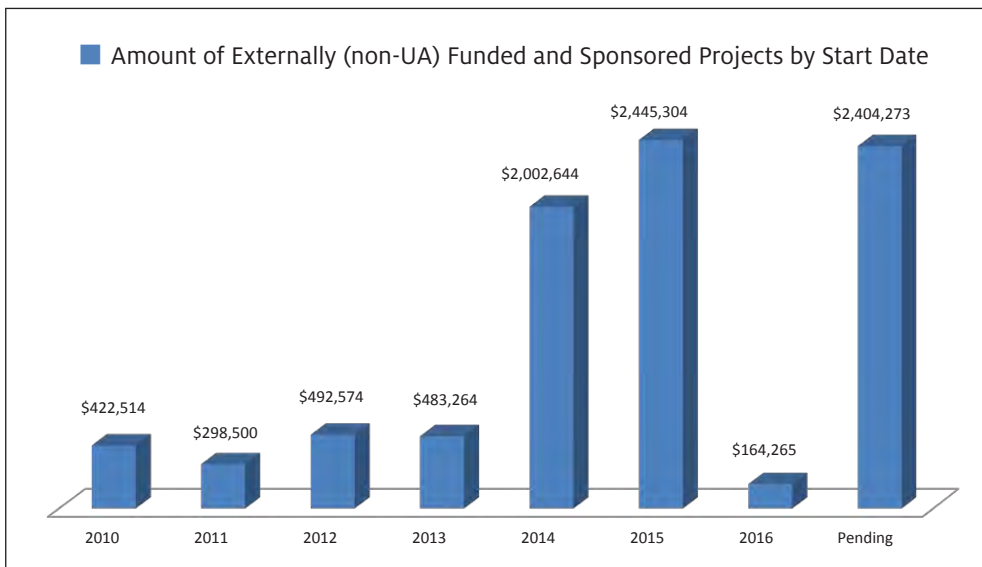
Mentoring

The department has long recognized the benefits of mentorship for early career faculty clinicians and, in 2003, created its own formalized mentoring program. The Department of Emergency Medicine Roadmap and Mentoring Program, directed by Dr. Frank Walter, provides clear strategies for career advancement for its faculty. The program pairs a senior faculty member as primary mentor with a junior faculty member. All faculty members create written career roadmaps vetted with mentors assigned by the department. Annual goals drive these roadmaps and are linked to annual performance reviews. Faculty survey results have shown department faculty greatly benefit from the department's promotion criteria, academic mission and mentoring process. The department has shared its mentoring roadmap with the College of Medicine to be used as a model for other departments.

The department chair strongly advocates mentoring and creating a supportive environment for faculty and residents. His commitment to research and mentoring is demonstrated in the department's ScholarQuest program, expecting each emergency medicine resident to complete and present an independent research project as a graduation requirement. (See **APPENDIX Q** for ScholarQuest curriculum.)

E.3. Participation, Leadership and Influence

Department faculty members are actively involved in the field and hold many prominent positions in local, national and international professional societies and review panels. **APPENDIX Y** lists individual faculty leadership roles, some of which are highlighted below:

One of the many leadership roles Dr. Harvey Meislin has held during his career is serving as president of the American Board of Emergency Medicine (ABEM) and as president and chair of the American Board of Medical Specialties (ABMS), the umbrella organization over all medical specialties in the United States. And due to his lifetime passion for promoting the specialty of emergency medicine through his leadership, mentoring and creative spirit, he was honored with the 2016 Association of Academic Chairs of Emergency Medicine (AACEM) Lifetime Achievement Award (only the second time awarded).

Dr. Samuel Keim, the department chair and distinguished professor of emergency medicine, also has contributed much to the development and growth of the field of emergency medicine. He has provided key leadership serving as the previous president of the National Council of Emergency Medicine Residency Directors and now the director for the American Board of Emergency Medicine. He also served on the Residency Review Committee of the Accreditation Council for Graduate Medical Education. As a nationally recognized leader, Dr. Keim was chosen to participate (2013-2015) as a scholar in the inaugural AACEM Chairs' Development Program (CDP). He now serves the CDP as a core faculty member. He has published widely on heat stroke, resident wellness, evidence-based medicine learning methods and prehospital epidemiology. He has been substantially engaged in UA College of Medicine and Practice Plan leadership roles.

Dr. Charles Cairns, UA College of Medicine dean, is a member of the emergency medicine faculty. He has been active in serving and promoting emergency medicine, including serving as the co-chair for the NIH Roundtables on Emergency Research, which resulted in the implementation of a new NIH Office of Emergency Medicine announced in July 2012. He has received numerous awards and honors, including the Emergency Medicine Foundation (EMF) Established Investigator Award, the American College of Emergency Physicians (ACEP) Outstanding Contribution in Research Award and the 2014 John Marx Leadership Award, the highest award of the Society for Academic Emergency Medicine (SAEM). He has been a member of the editorial boards of *Academic Emergency Medicine*, the *Annals of Emergency Medicine* and *Critical Care Medicine*.

Dr. Arthur Sanders was elected to the prestigious Institute of Medicine of the National Academies. As a member of the faculty since 1977, he has been a major contributor to the Sarver Heart Center Resuscitation Research Group, whose research developed chest compression-only CPR and cardiocerebral resuscitation. These new approaches to resuscitation from sudden cardiac arrest have already saved, and will continue to save, innumerable lives. He is a past-president of the Society for Academic Emergency Medicine.

Dr. Daniel Spaite is one of the most respected EMS researchers in the specialty and holds the Virginia Piper Distinguished Chair of Emergency Medicine. He has been the principal investigator or co-principal investigator for multiple randomized controlled trials (RCTs) that required exception from informed consent and has pioneered novel methodologies that now are standard for conducting research in the prehospital setting. His pivotal works include the Ontario Prehospital ALS (OPALS) Study, the Department of Transportation EMS Outcomes Study and EMS Cost Analysis (EMSCAP) Study, the Excellence in Prehospital Injury Care (EPIC and EPIC4Kids) Study and the Emergency Medical Services Outcomes Project (EMSOP). Results from these studies are published in the *New England Journal of Medicine*, *JAMA*, *Annals of Emergency Medicine* and other journals. He has been awarded top scientific abstract at

multiple national and international meetings and was appointed to the Institute of Medicine Committee on the Future of Emergency Medical Services.

Dr. Kurt Denninghoff is distinguished professor of emergency medicine and associate head for Research. He is the Southwest Hub principal investigator for the National Institute for Neurological Disorders (NIND)-funded Neurological Emergencies Treatment Trials Network (NETT), the node principal investigator for the Pediatric Emergency Care Applied Research Network (PECARN) and has mentored many NIH-funded junior investigators. He has patents for inventions related to noninvasive monitoring of central nervous system circulation.

Dr. Bentley Bobrow is distinguished professor of emergency medicine and medical director for the EMS and Trauma Systems division of the Arizona Department of Health Services. He has an international reputation pioneering effective population-based implementation of prehospital CPR in laypersons via telephone and EMS agencies. He also serves as co-principal investigator of the NIH RO1 Excellence in Prehospital Injury Care (EPIC) Study that has entered more than 30,000 major traumatic brain injured subjects, making it the largest cohort in history. He was appointed to the Institute of Medicine Committee on Treatment of Cardiac Arrest.

Of the department's 59 faculty, 26 are serving or have served as peer reviewers or members of editorial boards of multiple peer-reviewed journals, including but not limited to: *Annals of Emergency Medicine, Prehospital Emergency Care, Journal of the American Medical Association, Resuscitation, Academic Emergency Medicine, Journal of Emergency Medicine, Women's Health Issues, Intensive Care Medicine* and *Archives of Internal Medicine.*

Many more of the department's faculty participate as members, chairs and presidents of national, state and community agencies. Drs. Joshua Gaither, Terence Valenzuela, Bentley Bobrow and Daniel Spaite are the medical directors of Arizona fire departments all over the state. Dr. Bobrow has been in leadership positions of state agencies since 2004: Emergency Medical Services Council chair, Medical Direction Commission chair and medical director of the Arizona Department of Health Services Bureau of Emergency Medical Services and Trauma System. Dr. Dale Woolridge has been president of the Arizona Chapter of the American College of Emergency Physicians and has served as the president of the American College of Emergency Physicians Pediatric Emergency Medicine Section. Dr. Anna Waterbrook served as an appointed member of the American Academy of Orthopaedic Surgeons Appropriate Use Criteria for Management of Anterior Cruciate Ligament Injuries Voting Panel.

Our faculty have significantly molded, shaped, expanded and moved the field forward. The activities and leadership of the department have directly impacted saving lives, not just in treating acutely ill patients, but through their practice-altering insights and the development of evidence based protocols that increase survival rates.

E.4. Teaching

As **FIGURE E.6.** illustrates, the cumulative average score for Peer Review of Teaching (as documented in formal annual evaluations) has increased from the 2009 score of 0.74, to the 2015 score of 1.25.

FIGURE E.6. Average Score for Peer Review of Teaching

Evaluation . . . . Points
Truly Exceptional 2
Exceeds Expectations   1
Meets Expectations 0

Needs Improvement . . . . -1
Unsatisfactory . . . . -2
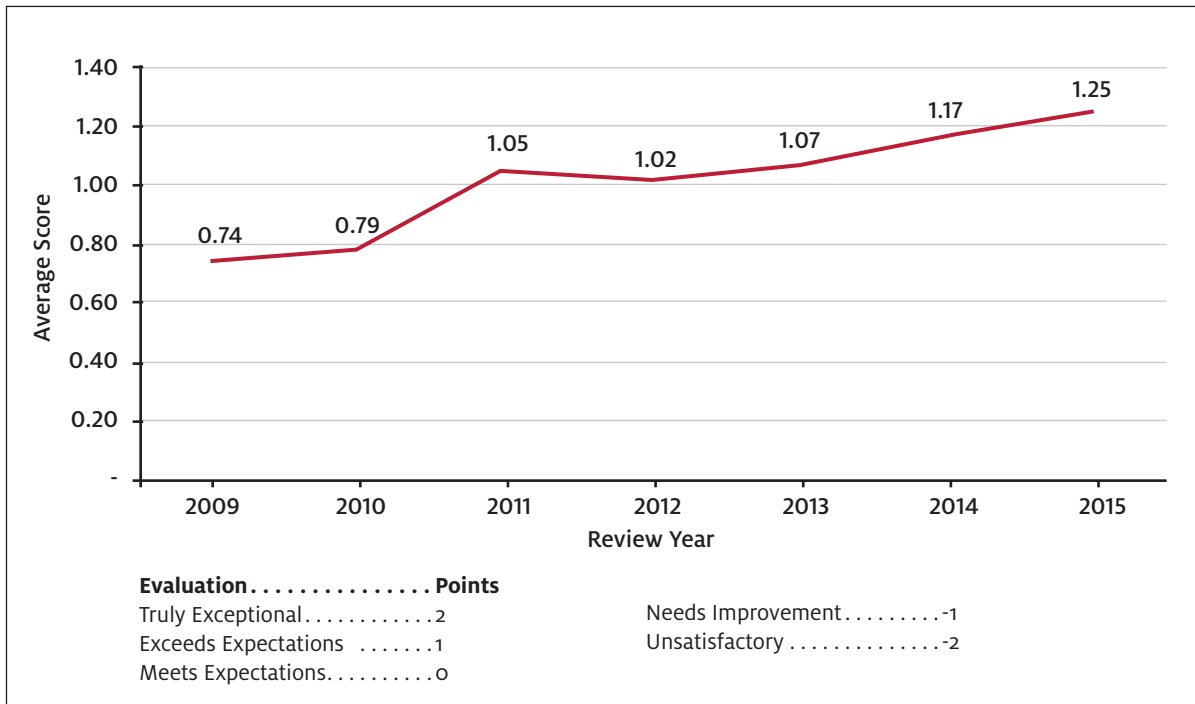
Residents evaluate the faculty using New Innovations software. The overall evaluation is based on a scale of 1 through 5, with 5 being outstanding. Presented in **FIGURE E.7.** are faculty evaluations by residents using a scale of 1-5, with 1 being "Poor" and 5 being "Excellent." See **APPENDIX I** for data.

FIGURE E.7. Resident Evaluation of Overall Program
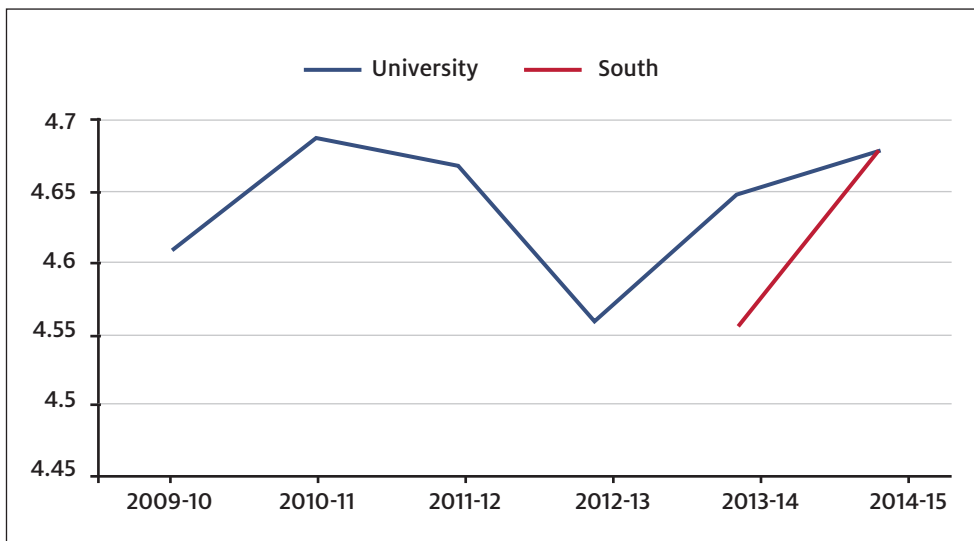
E.5. Faculty Recruiting and Planned Directions for Future Hires

APPENDIX J provides a detailed history of the chronology of faculty who were hired, retired, resigned and reviewed for promotion and tenure (including results) over the last seven years. During the period of review (2009-2016):

- 32 faculty were hired, 13 resigned and one retired.
- 19 faculty were promoted in rank.
- Average tenure of our faculty is approximately nine years.
- Faculty retention was 98 percent in 2014-2015, 100 percent in 2015-2016 and 100 percent in 2016-2017. We believe the new compensation plan will further improve faculty retention.

The department Leadership Council reviews strategic evolution on an annual basis as part of the annual retreat each fall. Subspecialty faculty needs are evaluated and an annual prioritization is completed. This has allowed steady growth of clinical and educational initiatives, as well as subspecialty programs. The Leadership Council serves as a formal search committee for future hires complemented by other key individuals as needed. All Leadership Council members are expected to complete Diversity and Inclusiveness training. In July 2016, the new faculty hires were aligned with strategic needs in Pediatric Emergency Medicine (2), Medical Toxicology and Emergency Ultrasound.

E.6. Faculty Compensation Comparison with Relevant Peer Institutions

FIGURE E.8. shows compensation for many faculty is below current national benchmarking. Sullivan Cotter, an outside consulting firm hired by Banner, has created a new compensation plan that provides incentives and salaries adjustments tied to clinical RVU productivity. Dr. Keim is co-chair of the Banner Compensation Oversight Committee and has had substantial engagement with the process. The plan will be based on a group productivity model that works well for the department. The department chair will have flexibility to fairly reward subspecialty and nocturnist faculty, as well as to recognize academic and value-added contributions. At present, we are in the shadow period of the plan, which will become effective July 1, 2017.

At the time of the Banner acquisition, faculty contracts were split between the UA and Banner Health based on a complicated set of rules that mainly used College of Medicine appointments to determine continued UA employment. Clinical faculty without UA appointments typically became Banner Health employees, with salaries and benefits differing between UA and Banner employees. **APPENDIX K** reflects the dual employment structure.

FIGURE E.8. Faculty Compensation Comparison

Current Salary Range Compared to AAMC Survey

— Current Salary Range - Low   — Current Salary Range - High   — AAMC 2014-2015 (Published January 2016) 50th Percentile
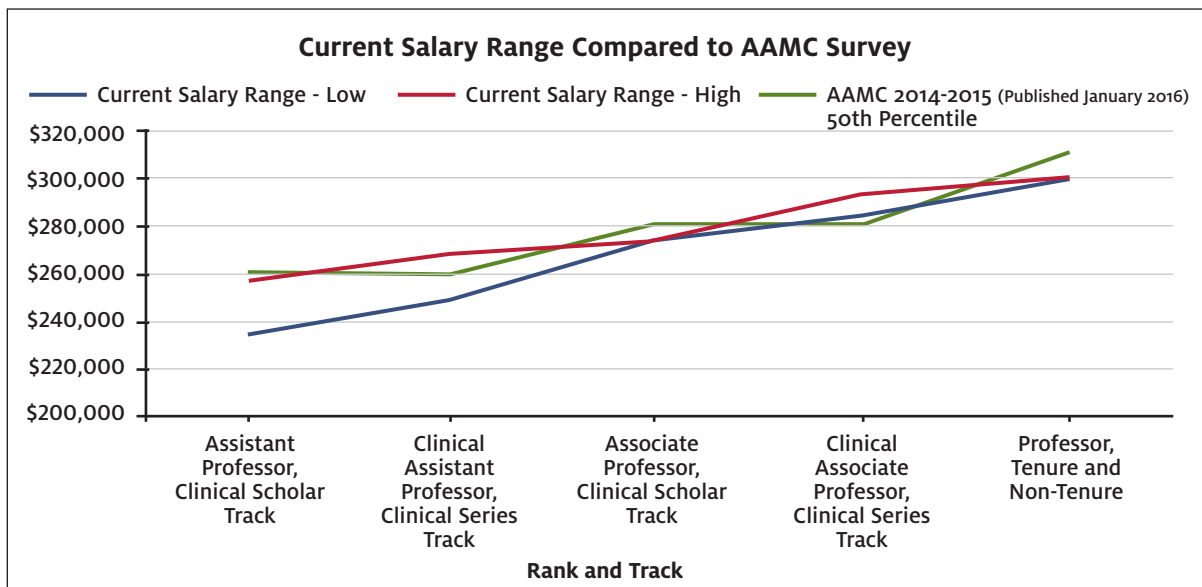
The current range of department salaries as shown in **TABLE E.2.** reflects some differences in clinical FTE and possibly hiring packages.

TABLE E.2. Current Salary Range

Rank and Track	Current Salary Range - Low	Current Salary Range - High	AAMC 2014-15 (Published January 2016) 50th Percentile
Assistant Professor, Clinical Scholar Track	$233,810	$257,191	$260,000
Clinical Assistant Professor, Clinical Series Track	$249,700	$268,521	$260,000
Associate Professor, Clinical Scholar Track	$273,900	$273,900	$281,000
Clinical Associate Professor, Clinical Series Track	$284,900	$293,447	$281,000
Professor, Tenure and Non-Tenure	$301,400	$301,400	$311,000

E.7. Gender and Race/Ethnicity of Faculty

The department believes there is strength in diversity. Department chair Dr. Samuel Keim actively seeks out diverse applicants to open positions. The Leadership Council, which serves as a core to faculty searches, is composed of faculty program leaders who have participated in institutional diversity workshops. All search committees require this training. The residency and fellowship programs also seek diverse applicant pools.

The department promotes diversity and disparity research and academic programs, including active participation by Dr. Keim as a mentor for under-represented minority faculty for the Office of Diversity & Inclusion at the UA College of Medicine. The department supported the residency director, Dr. Albert Fiorello, to participate in the Association of American Medical Colleges (AAMC) Mid-Career Minority Faculty Development program. This program seeks to address specific career development needs of mid-career faculty from a culturally responsive approach. **FIGURES E.9.** and **E.10.** show the current breakdown of faculty by ethnicity group and gender. **FIGURES E.11.** and **E.12.** compare the department faculty's ethnicity and gender to the College of Medicine overall. **FIGURE E.13.** includes gender comparison to Academy of Administrators in Academic Emergency Medicine (AAAEM) Faculty Survey.

FIGURE E.9. Number of Faculty by Ethnicity FY 2017
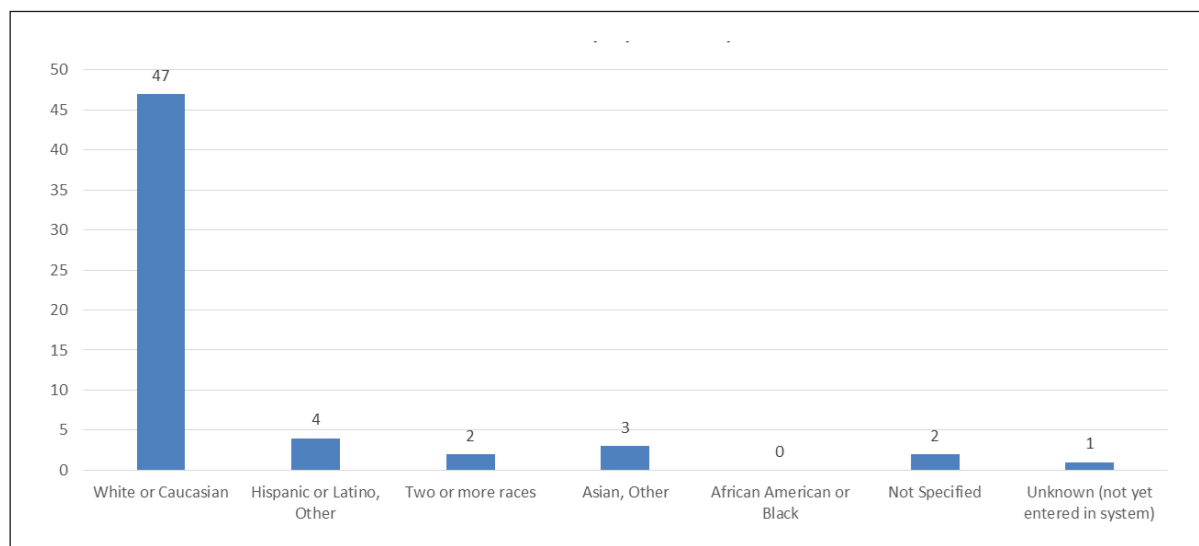
FIGURE E.10. Number of Faculty by Gender FY 2017
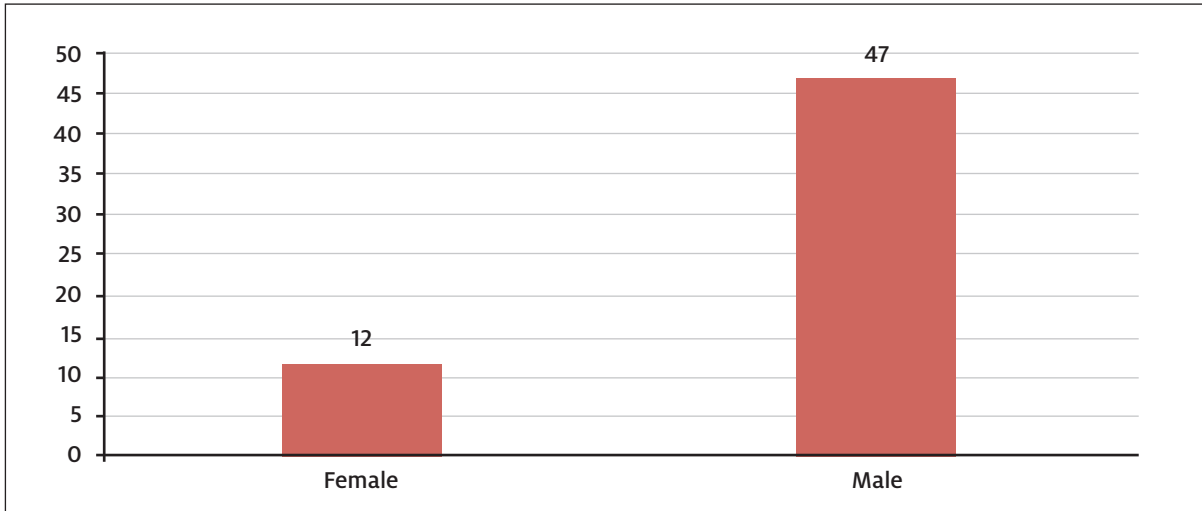
FIGURE E.11. Ethnicity of Faculty Compared to College of Medicine FY 2017
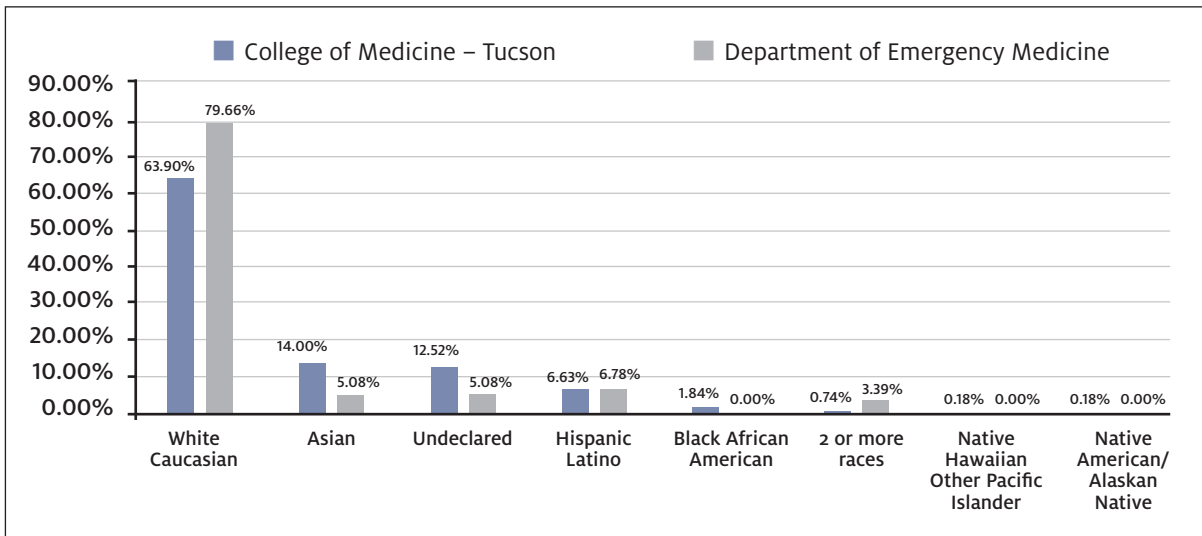
FIGURE E.12. Gender of Faculty Compared to College of Medicine FY 2017
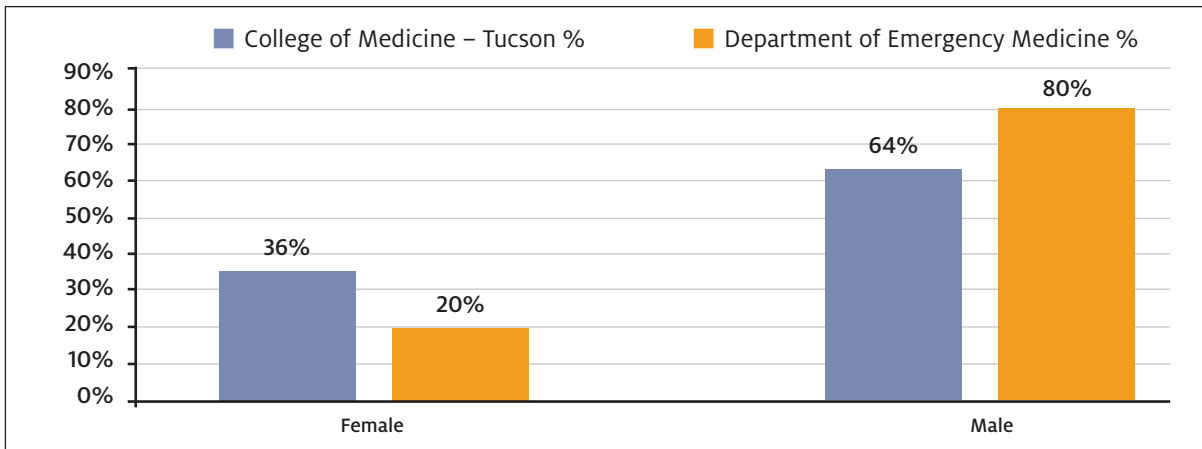
FIGURE E.13. Gender of Faculty Compared to National AAAEM Survey
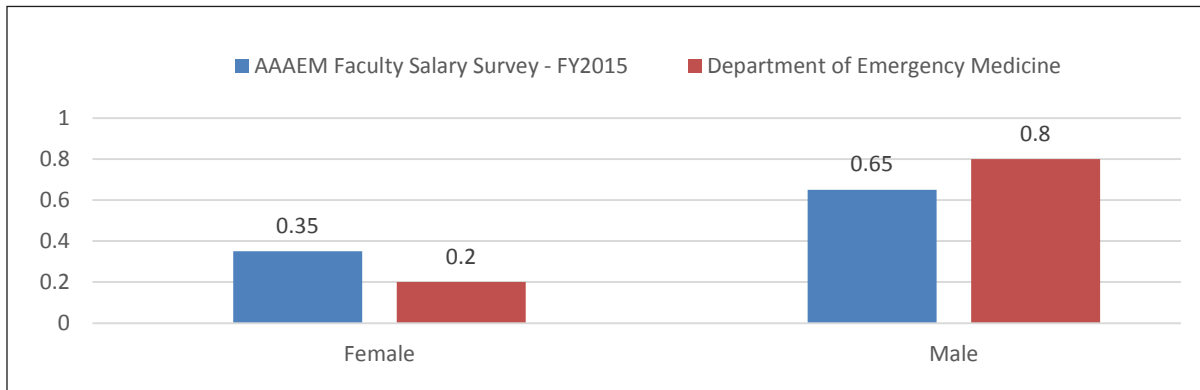
E.8. Biographical Sketches

Biographical sketches or CVs summarizing faculty members' research interests, honors and awards, publications, current grant funding, invited lectures and major service and committee assignments are included in **APPENDIX L.**

The University of Arizona created an online system for faculty annual reviews and CVs called UA Vitae. The Department of Emergency Medicine was one of the first departments in the College of Medicine to have 100 percent faculty participation.

Department Administration

Photo by UAHS BioCommunications

F. DEPARTMENT ADMINISTRATION

F.1. Organization and Governance Structure

The Department of Emergency Medicine is administered by Dr. Samuel Keim, who was appointed by the College of Medicine dean as interim department chair (head) in 2011 and permanent chair (head) in 2012. The department chair implements department clinical care, research, education and outreach goals and policies and represents the faculty to the College of Medicine, UA Health Sciences and Banner Health administrations. The department chair receives guidance from the department's Leadership Council, an advisory committee composed of 11 members, including nine director leaders within the department and two members at-large elected by the department faculty. The Leadership Council engages in strategic thinking and discussions, and creates collaborative proposals regarding significant broad-reaching department issues. Potential new policies or changes are forwarded to the council for review. Upon approval, a draft policy is distributed to all faculty members via a secure intranet for review and feedback. Policies are revised as necessary, voted on and approved by council members. The Leadership Council plays a major role in the department's organizational functions and has direct contact with the chair and faculty.

A second advisory committee is the department's Promotion and Tenure (P&T) Committee, consisting of eight members: Drs. Frank Walter (chair), Kurt Denninghoff, John Guisto, Katherine Hiller, Arthur Sanders, Daniel Spaite, Srikar Adhikari and Anna Waterbrook. The P&T committee advises the department chair on policies, faculty appointments, academic track changes, promotions and faculty administrative titles. The committee also completes the peer reviews during the faculty annual review process and submits them to the department chair for final review. Additionally, Dr. Walter directs the department's Mentoring and Faculty Development program to ensure all faculty members receive career mentoring and understand academic expectations and thresholds for promotion. This program includes a didactic curriculum, website to post all departmental/College/University faculty development opportunities and a faculty "roadmapping" process that is linked to mentoring.

Two-hour department faculty meetings are held once a month and rotate between the two clinical sites. These interactive meetings formally communicate news, financial data, changes in department, hospital or university policies, and status reports from the various sections. Minutes are available electronically to faculty. Annual clinical, research, academic and administration mini-retreats are held by medical directors, program directors, the administrator and associate research head to review annual outcomes of goals and address issues related to strategic planning and future goals. All faculty members are invited to participate in each mini-retreat. Following the mini-retreats, a department Leadership Council Retreat is held to bring all strategic planning and goals together to form the department's annual goals. This is then presented from the leaders to the entire faculty, along with quarterly written and oral updates, at the faculty meeting.

APPENDIX M depicts the department's organizational structure showing four major divisions – clinical, research, academic and administration – and the leaders responsible for various functions of the department. All faculty members report to the department chair and receive guidance from the program leaders. These four divisions perform established department tasks and develop their own goals and objectives with input from all faculty members.

The research division is managed by Associate Head for Research Dr. Kurt Denninghoff. The division works closely with AEMRC in Tucson and Phoenix. **APPENDIX M** also provides an overview of the AEMRC organization. Dr. Denninghoff serves as director of AEMRC-Tucson and Drs. Bentley Bobrow and Daniel Spaite are the co-directors of AEMRC-Phoenix.

Within the clinical division are three medical directors, Drs. Matthew Berkman (B-UMCS), Lisa Chan (B-UMCT) and Chad Viscusi (EM/Peds), who work with Banner hospital leaders to efficiently and effectively operate each emergency department. The medical directors participate in the department's

governance of clinical operations and in meetings on operations, quality assurance, safety and compliance. The seven nurse practitioners at B-UMCT report to Dr. Chan and the one nurse practitioner at B-UMCS reports to Dr. Matthew Berkman.

The academic division includes nine fellowship programs, three residency programs and an active medical education program. Each program is led by a director who reports to the department chair. The residency programs also have associate program directors and program managers/coordinators to assist in the task and coordination of activities. The residency programs follow Residency Review Committee (RRC) guidelines.

The administration division is led by department administrator Dale Borgeson, who oversees all staff reporting through additional layers of administrative structure. **APPENDIX M** includes staff employers (UA or Banner) and divisions. Computer technical support is supervised by the centralized College of Medicine IT program.

F.2. Classified and Professional Staff

The three tables below list our current classified and professional staff. **TABLE F.1.** details the department staff of 8.0 FTE for professional, 7.0 FTE for classified and four part-time student workers, who provide all the administrative, financial and education support for the department. **TABLE F.2.** shows our research support staff and **TABLE F.3.** details the Banner staff members, who handle patient financial services (PFS) and complete coding and billing for clinical services.

TABLE F.1. Administration, Financial and Education Staff by Appointment

Department of Emergency Medicine				
Name	**Dept. Hire Date**	**FTE**	**Classification**	**Title**
Barkley, Jo Marie	07/01/2014	1.00	Service Professional	Coordinator, Public Affairs
Calderon, Veronica	10/24/2011	1.00	Service Professional	Manager, Residency Program
Gould, Emily	08/01/2016	0.10	Student Worker	Student Group B
Howard, John	05/10/2011	0.5	Classified Staff	IT Support Analyst
Jacobson, David	12/3/2012	1.00	Classified Staff	Accountant, Associate
Jauregui, Graciela	03/24/2014	1.00	Classified Staff	Administrative Assistant
Kirkpatrick, Bryce	10/30/2014	0.25	Student Worker	Student Group B
Kirkpatrick, Victoria	02/10/2016	0.25	Student Worker	Student Group B
Mulligan, Patrick	06/01/2016	1.00	Service Professional	Manager, Residency Program
Pierce, Paulette	09/24/2001	1.00	Service Professional	Coordinator, Faculty Affairs / Web Content
Reed, Jessica	06/07/2010	1.00	Classified Staff	Executive Assistant
Reed, Tresa	02/18/2013	1.00	Classified Staff	Administrative Assistant
Richardson, Toni	02/01/1992	1.00	Service Professional	Asst. Dept. Administrator
Sproul, Jetta	08/11/2014	0.10	Student Worker	Student Group B
Stowe, Gregg	09/06/2012	1.00	Service Professional	Coordinator, Financial Affairs
Waters, Kristina	05/14/2012	1.00	Classified Staff	Program Coordinator, Senior

TABLE F.2. Research Staff by Appointment

Arizona Emergency Medicine Research Center (Tucson and Phoenix)				
Name	**Dept. Hire Date**	**FTE**	**Classification**	**Title**
Barnhart, Bruce	06/03/2008	1.00	Service Professional	Senior Manager, Research Support – COM PHX
Berren, Esther	01/14/1985	0.49	Classified Staff	Research Specialist, Senior – CSPC
Bissell, Shelley	10/29/2012	1.00	Classified Staff	Data Entry Specialist – COM PHX
Chea, Isabelle	10/17/16	1.00	Classified Staff	Research Specialist – COM TUC
Chikani, Vatsal	06/04/2012	0.34	Academic Professional	Epidemiologist – COM PHX
Clark, Ceret	07/25/2011	1.00	Service Professional	Coordinator, Research – COM PHX
Fuessler, Frank	08/26/2013	0.25	Classified Staff	Research Technician – Clinical Trials
Haro, Guillermo	08/04/2008	0.13	Academic Professional	Senior Coordinator, Research – COM PHX
Hollen, Adrienne	06/27/2005	1.00	Service Professional	Coordinator, Research IT – Data – Tucson Fire Department
Horton, Nancy	06/23/2014	0.25	Service Professional	Part-Time Appointed – Clinical Trials
Langhofer, Rachel	01/02/2007	0.38	Service Professional	Research Analyst – COM PHX
LeMay, Susan	09/20/2010	1.00	Classified Staff	Research Specialist, Senior – CSPC
Lowry, Rebecca	07/01/2014	0.68	Classified Staff	Program Coordinator – Child Fatality
McDannold, Robyn	09/04/2012	1.00	Academic Professional	Coordinator, Research – COM PHX
Naour, Michelle	02/18/2013	0.25	Service Professional	Part-Time Appointed – Clinical Trials
Ndayizeye, Fleury	02/24/2016	0.60	Classified Staff	Administrative Assistant – AHLS
Olkkola, Susanne	01/12/2015	1.00	Service Professional	Coordinator, Research Grant Support – all research
Perez Jr, Octavio	02/18/2013	0.50	Service Professional	Assistant Research Coordinator – COM PHX
Rogge-Miller, Karen	11/14/2011	1.00	Service Professional	Manager, Application Development – COM PHX
Stasinski, Virginia	01/14/2008	0.50	Service Professional	Coordinator, Research – Clinical Trials
Stieber, Jeff	08/20/2012	0.30	Academic Professional	Senior Coordinator, Research – COM PHX
Tobin III, John	11/14/2011	0.19	Academic Professional	Educator, EMS – COM PHX
Williams, Amy	01/16/2006	1.00	Classified Staff	Program Coordinator, Senior – AHLS

TABLE F.3. Banner Staff

Banner Staff			
Name	**Dept. Hire Date**	**FTE**	**Title**
Aguirre, Maria	02/2006	1.0	PFS Rep Sr., Physician Practice
Borgeson, Dale	11/2009	1.0	Department Administrator
Hatmaker, Peggy	07/1998	1.0	Reimbursement Sr. Consultant
Kellen, Mary Ann	11/1981	1.0	Clinical Practice Administrator
McDonald, Mary	06/2012	1.0	Prehospital Manager, Tucson Fire Depart.
Peters, Tom	03/2016	1.0	Business Analyst II
Weisman, Scott	07/2016	1.0	PFS Rep Sr., Physician Practice
West, Christine	08/1999	1.0	PFS Rep Sr., Physician Practice

The seven-year employment history for staff is included in **APPENDIX N**. Several individuals have long-term service with the department. Some staff turnover is due to students leaving after graduation. Turnover for the B-UMCS administrative assistant position is the result of difficulty finding a suitable individual for this position. Another position that has had turnover is the University of Arizona College of Medicine at South Campus residency program manager. This turnover also was due to finding an individual who fits well with the department and the job. Loss of research grant funding in fiscal years 2015 and 2016 caused significant turnover in our research section; the clinical research nurses were required to transition to Banner employment and all declined to make this transition.

The department's efforts to retain staff are evident from the long-term service of many of our members. A yearly half-day staff retreat is held to discuss goals for the upcoming year. Staff members are encouraged to attend professional development seminars and training workshops regularly offered by the UA. Three of our classified staff members are attending the UA for higher level degrees.

To increase communication and camaraderie, we created a newsletter specifically for the staff called *The DEM Staff Chat*, providing an opportunity to share information about new hires, staff achievements, training courses available on campus, birthdays, weddings and birth announcements and vacation stories and photos. This is in addition to the department's outreach electronic newsletter, *Emergency Medicine News*. Examples of the newsletters can be found in **APPENDIX O**.

The department chair promotes an environment that encourages diversity while creating a strong staff cohort. Staff hiring includes searches reviewing applicants in UA Career Tracks to find the individual who is the best fit for the job. **TABLE F.4.** outlines the gender and ethnicity distribution for the department and research staff.

TABLE F.4. Race and Ethnicity of Classified and Professional Staff (Tucson only)

Classified Staff = 13	Ethnicity	Gender
	White = 10	Male = 4
	Hispanic/Latino = 1	Female = 9
	Black/African American = 1	
	Asian = 1	

Student Workers = 4	Ethnicity	Gender
	White = 4	Male = 1
		Female = 3

Professional = 12	Ethnicity	Gender
	White = 9	Male = 2
	Hispanic/Latino = 1	Female = 10
	Not Specific = 2	

Sum = 29	Ethnicity	Gender
	White = 23 (80%)	Male = 7 (24%)
	Hispanic/Latino = 2 (7%)	Female = 22 (76%)
	Black/African American = 1 (3%)	
	Asian = 1 (3%)	
	Not Specific = 2 (7%)	

F.3. Adequacy of Staff Support

Administrative support for our department operations is extremely lean. Assistance (not including the coding and billing for patient care) comes from five groups of individuals: front office staff (2.0 FTE plus students), central business team (4.0 FTE), education support staff (4.0 FTE), research support (14.86 FTE) and public and faculty affairs team (2.0 FTE plus student):

- Front office staff supports the department chair, department administrator and clinical medical directors for both campuses. These members also are responsible for faculty onboarding, credentialing, the clinical schedule, space renovations, travel paperwork assistance, purchasing equipment and supplies and general office support.
- Central business office staff oversees the UA and clinical budgets, extramural funding from grants and contracts, faculty incentives, physician productivity dashboards and clinical financial reports. These individuals also are responsible for preparing paperwork for newly hired faculty and staff, payroll and assisting with human resources.
- Education support staff provides administrative assistance to the three residency programs, three of the fellowship programs (EMS, Medical Toxicology and Emergency Ultrasound) and the medical student clerkship. This includes rotation scheduling, the accreditation reports, conferences, interview schedules and budgets for each program.
- Research staff provides support for grants, clinical trials and our Advanced Hazmat Life Support (AHLS) program. This includes grant writing, ensuring research compliance, seeking approvals,

administration assistance for grants and clinical trials, patient registration for the trials, AHLS course scheduling and managing program budgets.

- Public and faculty affairs team members are responsible for faculty promotion and tenure, annual reviews and faculty development. They also manage the department's website, produce the department's newsletters and write and distribute media releases and news articles.

Since the department administrator is the only Banner employee aside from the coding and billing team, UA staff must take on clinical tasks without salary support from Banner. Some of the clinical tasks include: credentialing, hiring and onboarding for Banner physicians, clinical financial reports, accounts payable and physician reimbursement. The growing amount of clinical administrative tasks is impairing the UA administrative work. To address this need, we plan to hire an additional Banner administrative staff member and have included that position in our CY 2017 Banner budget.

We have four key administrative leaders who are a few years from retirement. These individuals include the department administrator, assistant department administrator, coordinator of faculty affairs and the clinical practice administrator. Succession plans need to be created for each individual in order to allow for the department's future success.

Within the academic division, the current support is meeting RRC requirements for our residency and fellowship programs, and we see no immediate need for additional staff support or reconfiguration to improve efficiency.

Department Resources

Photo by Kevin Reilly, MD

G. DEPARTMENT RESOURCES

G.1. Appraisal of Support Services

Support for Teaching

The academic division within the Department of Emergency Medicine includes three residency programs and nine fellowship programs, as well as a number of undergraduate, graduate and medical school courses. Department faculty members also serve as funded medical student mentors in the UA College of Medicine Societies Mentorship Program, as well as ArizonaMed Block Directors.

ACGME Residency Programs. On July 1, 2016, all residents and fellows became Banner employees. Banner provides direct salary and benefit support for the residents through the College of Medicine Office of Graduate Medical Education (GME). Banner support also includes:

- Residency program directors receive protected administrative time through the GME office. Their clinical duties are limited per ACGME Residency Review Committee (RRC) to 960 hours.
- Associate program directors receive protected administrative time through the GME office. Their clinical duties are limited per RRC to 1,152 hours.
- We have 26 ACGME residency program key/core faculty for the three residency programs, which by RRC rules must have a three-to-one resident-to-faculty ratio. Core/key faculty clinical hours are limited by emergency medicine RRC to no more than 1,340 hours annually. This represents 93 percent of a full-time clinical FTE. Previously under UAHN, the hospital paid the 7 percent gap to achieve 100 percent support for core faculty. We are waiting for Banner approval to support the remaining 7 percent of core faculty FTE. The emergency medicine RRC rules do not allow host institutions to make core faculty earn this gap through other activities besides serving residents.
- Our residency program coordinator for both the University of Arizona College of Medicine – Tucson Program and the University of Arizona College of Medicine Combined Emergency Medicine/Pediatrics Program receives 100 percent support. In the past, the UAHN did not provide funding for the residency program coordinator for the University of Arizona College of Medicine at South Campus Program. We have requested Banner Health to support this mandated position.
- Historically, the department provided indirect academic support to the residency programs at the rate of $2,600 per resident or more than $200K annually. This now is being discussed with Banner Health to formalize a new support process. This is a key need for future success.
- We have budgeted residency academic expenses plus program director expenses and core faculty expenses in our CY 2016 and CY 2017 Banner budgets.

Fellowship Programs. The department has both ACGME and non-ACGME fellowship programs. Currently, the department funds all of these fellowship programs with the exception of partial GME support for Emergency Medicine/Critical Care and Sports Medicine Fellowships. We are engaging with Banner to achieve funding support for fellowship program directors and coordinators.

Medical Student Education. State support for education has been reduced by half over the past seven years, averaging a 5-10 percent decrease per year. This makes it difficult for faculty to maintain or add to their teaching hours in the face of decreasing compensation and expectations to do more with less. The fourth-year Emergency Medicine/Critical Care Rotation has been approved by the College of Medicine as a mandatory rotation, but is not yet recognized as a clerkship and does not receive full funding like other required clerkships. This is a key need for future success.

The College of Medicine provides partial funding support for our Societies Mentors and Block Directors, as well as for ArizonaMed curriculum teaching time. The department has four Societies Mentors, each with 30 percent support from the college. We also have one Block Director, one Thread Director, one Associate Course Director and two key medical student teaching faculty. In addition, our faculty members lead an undergraduate course and internship in Emergency Medical Services, as well as in Clinical Translational Research. A list of undergraduate courses offered by department faculty can be found in

APPENDIX P. Department faculty accumulated a total of 4,298 ArizonaMed teaching hours during FY 2016, making our department one of the largest contributors to teaching in the medical school.

Support for Research

Designated a statewide center of excellence by the Arizona Board of Regents (ABOR), the Arizona Emergency Medicine Research Center (AEMRC) was established in 2001. All research carried out by department and research center faculty directly is related to improving patient care. As shown in Section E, the total amount of research dollars for grants led by our faculty is $2.25M annually. We have budgeted sponsored federal grant expenses of $1,119,264 for FY 2017. As of 2015, our department's rank of 18th in National Institutes of Health (NIH) funding in the Blue Ridge Institute for Medical Research report is the highest ranking of any department at the UA College of Medicine.

Clinical Support

More than 90 percent of emergency department revenue is earned through clinical activity. Department patient volume has grown substantially from 64,864 in 2001 to more than 135,000 today, an increase of about 5 percent annually. Emergency medicine faculty carry on robust clinical activity under Banner University Medical Group that centers on treating patients in two emergency departments, submitting annual charges of more than $65M, and earning 320K Relative Value Units (RVUs). Our RVU productivity is above the 70th percentile on Vizient Faculty Practice Solutions Center (FPSC) benchmark, with average of more than 10,000 RVUs earned annually per 1.0 Clinical Full-Time Equivalent (CFTE).

Our faculty physicians serve as leaders in promoting point-of-care ultrasound, as well as resuscitation, in the emergency department and are focused on providing intensive care unit (ICU)-equivalent care as soon as patients arrive and before a bed becomes available in the medical intensive care unit (MICU). We are working with Banner to spread expertise in emergency point-of-care ultrasound to all Banner emergency departments.

As a clinical preparedness unit, we staff more than 60,000 hours of patient care annually. Coverage comes from 53 emergency medicine faculty attending physicians and 11 fellows, plus eight nurse practitioners and two family medicine doctors who staff our sub-acute Fast Track units.

Physical space consists of two modern emergency departments on two campuses: Banner – University Medical Center Tucson (B-UMCT) and Banner – University Medical Center South (B-UMCS). Both emergency departments were renovated in 2009, just after our last Academic Program Review.

B-UMCT. The B-UMCT Emergency Department has 61 treatment spaces in addition to triage and Fast Track space, covering more than 40,000 square feet. It includes a seven-bed trauma and resuscitation center, an 18-bed pediatric emergency pod, an 18-bed high acuity south pod, an 18-bed medium acuity central pod, a 10-patient-space Fast Track and a six-bed physician secondary triage area known as Rapid Medical Evaluation (RME). The continued growth of patient volume has made the Fast Track, RME and triage areas woefully inadequate. The department receives $1.2 million funding from the hospital to staff two nine-hour RME shifts per day at B-UMCT.

Two heliports are located on the roof. As the only Level I Trauma Center in southern Arizona, western New Mexico and northern Mexico, we receive critical patients throughout the region. About 15 percent of emergency department patients arrive by air or ground ambulance, and more than 40 percent of those patients are admitted to the hospital.

B-UMCS. The B-UMCS Emergency Department is a modern unit with 50 treatment spaces. Census is more than 50,000 patients a year and growing at more than 3 percent annually. The emergency department is the source of more than 75 percent of inpatient admissions to the hospital. In addition, the emergency department has a special five-room unit for behavioral health patients, which constitute 15 percent of the patient census and 70 percent of admissions to B-UMCS. The emergency department sees a number of

state, county and federal prisoners, and includes a four-room unit for law enforcement patients. Another eight-bed sub-acute unit allows low acuity patients to get expedited treatment on a separate path from higher acuity patients. B-UMCS is a Level IV Trauma Center. At B-UMCS, the hospital funds $1 million to staff one nine-hour RME shift per day with an additional nine-hour shift five days per week.

Administrative Support
As previously mentioned in Section F, Dale Borgeson, MBA, serves as department administrator with overall responsibility for all areas of administration. The department's revenue cycle team for Banner – University Medical Group (BUMG) is composed of a clinical practice administrator, a reimbursement senior consultant, a business analyst and three patient financial services staff. See **APPENDIX M** for organization chart. This team is supported by UA staff, including a coordinator of financial affairs, an assistant department administrator and an executive assistant. Coding is managed by BUMG Coding Alignment, and billing is managed by the BUMG Professional Business Office (PBO).

With the Banner acquisition in March 2015, all department administrators, including Dale Borgeson, became Banner directors with dual reporting to Banner executive directors and department chairs. We have managed this successfully due to alignment of the department's mission and goals with Banner Health. Nevertheless, many important issues remain to be worked out:

- Department administrators, who are now Banner directors, have no formal management or supervisory authority over university staff. About two-thirds of department staff members are UA employees, causing a contradiction for the administrator who is the chair's "chief of staff," but now lacks direct authority with UA employees. This is managed by the department chair giving the administrator explicit direction to act on his behalf and serve as chief of staff for all employees.
- Banner has rolled out a "separation of duties" rule within departments, meaning that only Banner employees are supposed to perform Banner clinical or administrative work. However, since the department administrator has been our only Banner administrative employee outside of our revenue cycle team, many UA staff members are doing a significant amount of clinical administrative work necessary for departmental functioning without being recognized or paid by Banner. This problem is especially acute when it comes to approval authorization by Banner, as the Banner administrator is the only director who can approve payroll, reimbursement, travel, computer access, etc., for all Banner faculty, residents, fellows and staff in the department. We proposed a matrix model allowing split funding for staff responsible for both academic and clinical duties, but it was rejected. We are addressing this problem by recruiting another Banner administrative staff member to take on these clinical administrative duties.

Support for Outreach
Department faculty members receive outside contract support to serve as medical directors for both hospital emergency departments, for regional fire departments and Pima County and State of Arizona EMS/Trauma and Disaster Preparedness agencies.

G.2. Specific Resource Needs
The Banner transition and implementation of the new physician compensation plan during FY 2017 includes the elimination of "unfunded" time, meaning that clinical dollars cannot be used to support nonclinical work. On the other hand, state funding support for teaching has been cut in half over the past seven years. This presents a significant challenge for funding academic teaching, research and scholarly efforts over the next five years. This is the final year of Dr. Samuel Keim's chair package, with $240,000 fully committed to funding research support staff.

Stimulus Funding for New Research. Banner Health is committed to annually funding 5 percent additional academic time for faculty at 5 percent of the value of Banner-paid FTE. We are using the Banner-funded 5 percent academic protected time to develop and promote academic achievement by faculty. This is an inadequate amount of protected time to accomplish our minimum and otherwise unfunded core academic and administrative expectations. Needed is 10 percent of aggregate clinical FTE funding. Given the substantial cutback in state funding, the existing balance in our professional fee reserve fund is fully committed for FY 2017 salary funding for administrative support, including accountants, analysts, IT support and public affairs.

The major research stimulus package requested by the department will support our principal investigators, who are well positioned to continue and advance federal and nonfederal grant funding. We are the highest ranked department in the College of Medicine in NIH funding, and are highly regarded by the NIH and other federal funders, as well as nonfederal sponsors. The stimulus proposal aims to bridge the funding gap and bring to fruition major research initiatives.

Clinical Trial Support. The department is working to broaden support from UA Health Sciences (UAHS) and the College of Medicine to have collaborating departments share expenses for clinical trial research program coordinators in the emergency department. We are cooperating with the dean's office on backstopping our clinical trials deficit and organizing a college-wide effort to support program coordinator coverage. Only through college-wide collaboration will we have the resources to build an effective cadre of clinical trial program coordinators capable of optimizing enrollment in studies.

The department's Virginia G. Piper Charitable Trust endowment will continue to cover partial salary for Dr. Daniel Spaite, a leading researcher and our associate director of AEMRC-Phoenix. Quasi-endowments funded by past savings from professional fee earnings will continue to provide partial salaries for leading distinguished professorships held by Drs. Samuel Keim, Kurt Denninghoff and Bentley Bobrow. Additional funds are used for annual strategic needs. We are working with the UAHS Development Office to explore external donors who will support department research. A Development Advisory Board has been established that is composed of UA, Banner and Tucson community leaders.

Faculty Salaries. Our highly productive faculty attending physicians stand to gain significantly in base salary and clinical incentives with the implementation of the new Banner physician compensation plan. Currently, we are in the lower right quartile of the scatterplot, meaning high productivity and low compensation. Modeling using our productivity in the new plan shows our compensation rising significantly over the next three years up to the 45 degree angle, representing a good balance between compensation and productivity (see **FIGURE G.1.**). This will help stabilize our effort to retain current faculty and recruit talented new faculty.

FIGURE G.1. Alignment of Pay and Productivity

TCC (LG/Academic Weighted) v. wRVUs (LG)
(Percentile Ranks)

TCC: Market Percentile (y-axis, 0 to 100)
wRVUs: Market Percentile (x-axis, 0 to 100)

EM

- Medical Based Specialties
- Surgical Based Specialties
- Hospital Based Specialties
- Primary Care

LG – Large Group   TCC – Total Cash Compensation
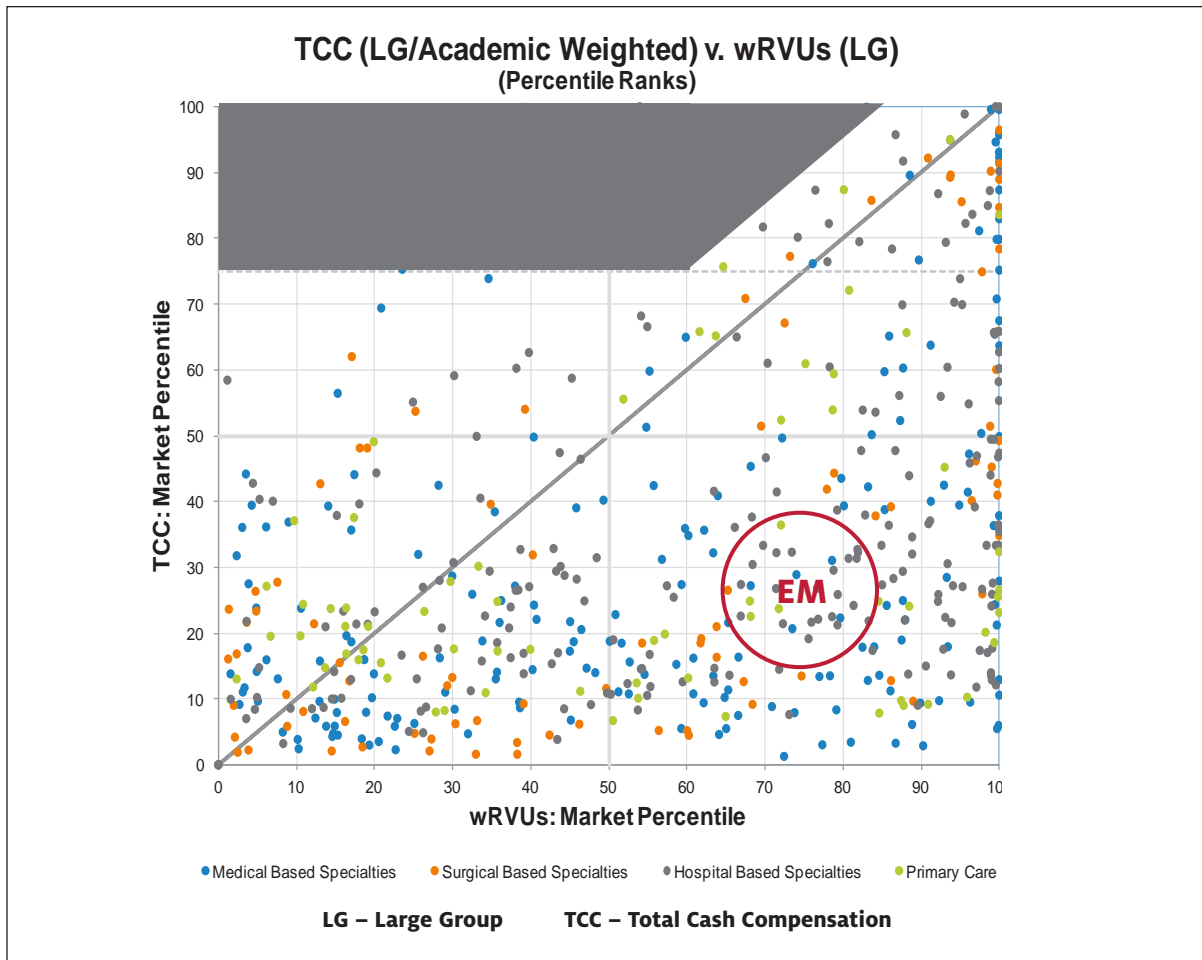
Banner has supported our faculty recruitment, allowing us to employ five new physicians in FY 2017 to meet expanding volume and coverage needs. Recruitment priorities include hiring more dual-boarded faculty to support expansion of clinical activity in our subspecialties, such as critical care, sports medicine, toxicology, pediatrics, clinical informatics, EMS and palliative care.

Staffing Support. Teaching faculty and clinical directors have no administrative support staff to provide the necessary infrastructure to schedule meetings, create minutes, create effective presentation materials, etc. Clinical faculty members have no administrative support for assistance with credentialing, maintenance of certifications and licensure, preparation of annual reports, maintenance of curriculum vitae, etc. The lack of support to faculty is troubling for a department of this size.

ACGME Funding Support. As the department transitions our residents and fellows to Banner employment, we need to stabilize funding for ACGME programs. Not yet resolved is our current academic funding for our residents, collectively worth more than $200,000 or $2,600 per resident. We have included this in the Banner CY 2016 budget, but the issue is still being negotiated between Banner and College of Medicine leaders. In FY 2016, the department covered this entire cost.

We also need support from Banner for our 26 key/core faculty, whose clinical hours are limited by emergency medicine RRC mandate of no more than 1,340 hours, which is .93 CFTE. We expect Banner to pay the gap of .07 FTE each or 1.74 FTE collectively because Banner now owns the residency programs. Further, we expect Banner to fund all the emergency medicine RRC-mandated program coordinator positions.

Undergraduate and Medical Student Education Support. The Emergency Medicine/Critical Care Rotation has been evaluated and approved by the Tucson Educational Policy Committee (TEPC) as a required fourth-year rotation for all medical students. Yet, due to College of Medicine funding issues*, we have not been provided with the standard funding for medical student clerkships. College of Medicine clerkships of this size receive funding at the level of 25 percent paid protected time for the course director, as well as support for a course coordinator. Similarly, our Ultrasound Elective Course for medical students is still seeking funding. Tuition from our very popular Emergency Medical Services Course for undergraduates does not flow to our faculty, who teach the courses with significant expenditure of effort.

Centralization of Space. Our administrative offices, consisting of more than 18,000 sq. ft., will be relocated some time during FY 2018 due to new hospital construction. Because of the expected construction completion dates, the department may be required to move twice, with the final space designation goal in the main hospital building being vacated by outpatient clinics (FY 2019).

We need a centralized space on the Tucson campus (B-UMCT) to bring together our faculty and staff and to optimize synergy in carrying out their clinical, teaching, research, scholarly and administrative activities, plus resident and fellows teaching and conference space. Currently, space is inadequate for centralized services, such as meeting space, printing, copy and production space and lounge/break-area space. Restroom access is inadequate for the faculty and staff.

Physical space for the residents is poor. Their communal office has not been renovated in more than 40 years. Residents are hampered by inadequate computer support and lack of privacy in the office setting, making it difficult for patient follow-up phone calls. Space is insufficient for study and presentation preparation.

G.3. Projected Changes and Quality Outcomes

- A central administrative and faculty and resident office and teaching space will stabilize department operations and allow for synergy between our faculty.
- Adequate funding for our ACGME programs will stabilize operations and allow faculty to focus appropriate attention on teaching and education.
- Adequate funding for our medical education courses will stabilize our required Emergency Medicine/Critical Care Rotation, which is approved as a clerkship, but not yet supported due to lack of college funding.
- Sufficient Banner administrative staffing will allow us to meet growing clinical administrative demands, while not taking UA administrative staff away from their UA duties.
- Adequate funding for our clinical trials research programs will enable us to expand screening activity and gain significant enrollments in current clinical trials. Collective effort to resolve deficits and to share expense for recruitment of program coordinators will translate into necessary involvement of research subjects.
- Adequate stimulus funding for our research investigators will stabilize operations and allow our established principal investigators to greatly expand pursuit of extramural funding from federal and nonfederal sources.
- Banner support for physician compensation commensurate with productivity will stabilize faculty retention and allow us to recruit the most talented clinicians, particularly dual-boarded faculty in key areas of growth such as critical care.
- Banner support for innovative clinical programs, such as expanding emergency department point-of-care ultrasound, will improve the quality of patient care.

*Responsibility Centered Management (RCM) is a University of Arizona budget model designed to make the budgeting process more transparent, more decentralized and more closely aligned with UA President Hart's Never Settle strategic academic and business plan. RCM replaces the UA's previous incremental, centrally allocated budgeting model, where funds flow from central administration to colleges, support units and facilities. This new model will improve tracking, but may not increase departmental income to cover the medical student teaching done by the department.

Medical Student, Undergraduate and Graduate Teaching Programs
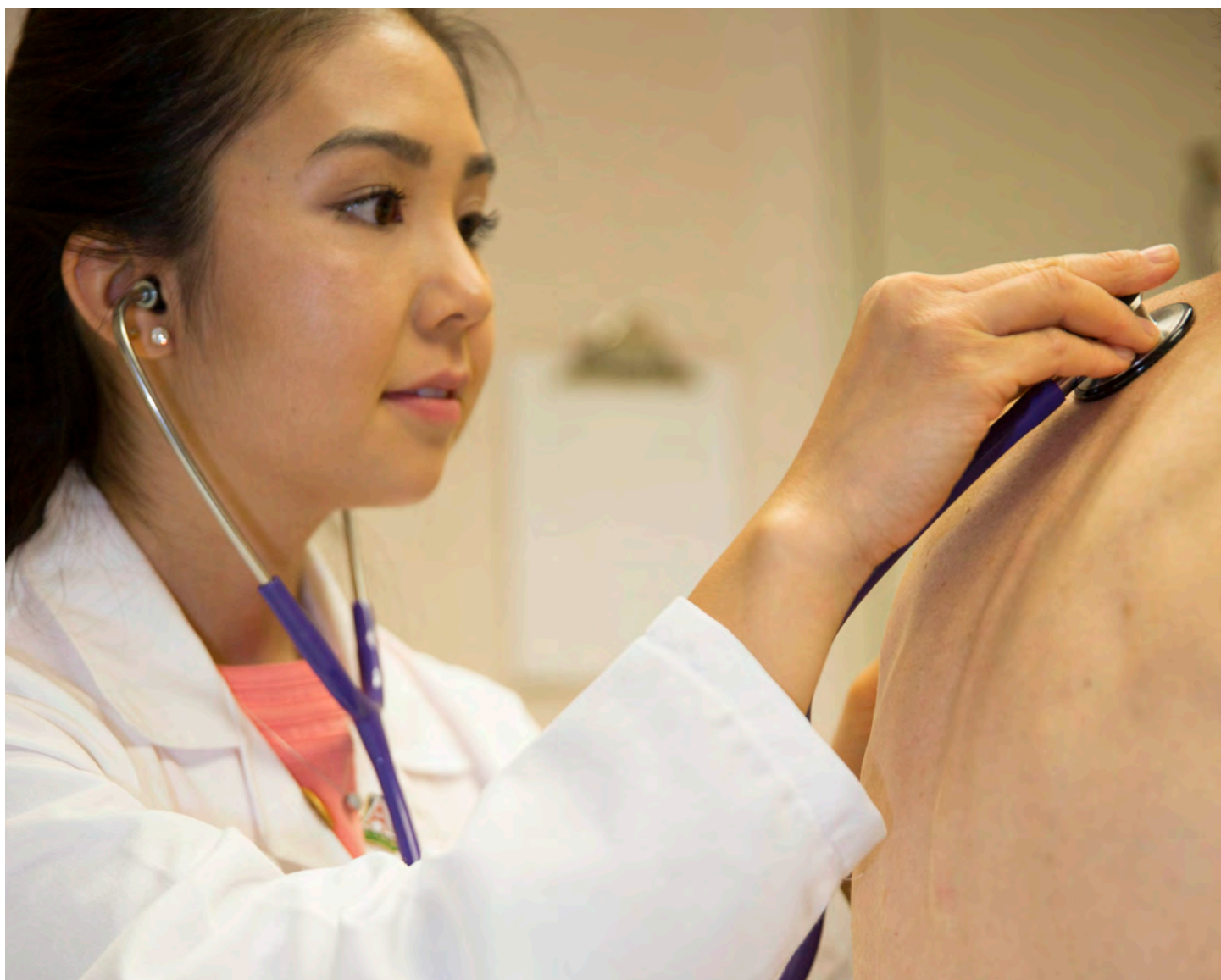
Photo by Kevin Reilly, MD

H. MEDICAL STUDENT, UNDERGRADUATE AND GRADUATE TEACHING PROGRAMS

H.1. Department Teaching Activities

The Department of Emergency Medicine faculty members participate in a variety of activities, including course didactic teaching, clinical teaching, mentorship and research advisement and direction. Additionally, faculty members hold various leadership positions in the College of Medicine directly related to teaching, the medical student curriculum and career development.

Faculty involvement in the teaching of medical students begins on day one. The department currently has multiple College of Medicine Societies Mentors, Clinical Reasoning Facilitators, as well as one Block Director and one Course Director. Department faculty members also lead longitudinal CPR instruction courses and Evidence-Based Decision Making Thread, as well as mentor students in the medical student Research Distinction Track. Additionally, Dr. Arthur Sanders serves as the chair of the College of Medicine's Tucson Educational Policy Committee (TEPC) and Dr. Richard Amini serves as assistant dean for Student Affairs, both integral parts of the college and the medical student experience.

Clinical education of both UA medical students and rotating students from outside institutions is a fundamental part of our department's values and mission. In the clinical years, the department offers many core and elective emergency medicine rotations, including the very popular fourth-year Emergency Medicine/Critical Care Rotation. All clinical faculty members educate students who take the third-year Emergency Medicine Elective and fourth-year Medical Toxicology, Wilderness Medicine and Emergency Ultrasound clinical rotations and electives. Faculty members participate as research mentors for any medical student who seeks a research experience in emergency medicine. Furthermore, faculty members provide individualized specialty career mentoring for all students pursuing a residency in emergency medicine.

Outside formal instruction, faculty members volunteer their time to teach extracurricular student groups. Specifically, department faculty serve as advisers to the Emergency Medicine Interest Group (EMIG), the Ultrasound Interest Group (USIG) and the Resuscitation Education and CPR Training Group (REACT), spending hours annually giving didactic lectures and teaching hands-on workshops to medical students interested in learning more about emergency medicine.

The department has a strong presence in undergraduate and graduate education. Undergraduates seeking to learn more about a career in emergency medicine can participate in an internship course in which they volunteer to gain exposure in the emergency department.

In line with our prominent presence in prehospital care, the department offers an undergraduate Emergency Medical Services Course, teaching students about the EMS system. Students in this course often volunteer as first responders in the University EMS Group, responding to 911 calls on the UA campus. Students in the University EMS Group receive two hours of monthly continuing education provided by our faculty.

Consistent with our research mission, the department offers a Clinical and Translational Research Experience to undergraduates, in which students learn the principles of clinical research through formal coursework. They apply those skills in our Emergency Medicine Research Associates Program (RAP), aiding in the screening of eligible patients for our various clinical research studies and data gathering for our resident ScholarQuest projects.

Our involvement with graduate students lies largely within the research realm, in which our faculty members mentor a variety of graduate students seeking their master's and doctoral degrees. Often, these graduate students participate in our emergency medicine clinical research.

The department has cooperatively developed policies and procedures with the hospital's Volunteer Services to allow students from various educational backgrounds to shadow in the emergency department. Students are vetted and health and immunization histories are reviewed to meet standards required by regulatory agencies. Students gain exposure to the health-care environment and access to clinical faculty who are able to provide important guidance for their health-care careers. Dr. Lisa Chan has collaborated with the UA to create an emergency department internship for students wanting a month-long experience in the emergency department through an advanced volunteer role.

The conglomeration of our teaching involvement reflects one of the most significant impacts the department has on the academic community at the UA. See **APPENDIX P** for a list of undergraduate, graduate and medical school courses offered by the department.

H.2. Faculty Involvement and Quality Assessment

As mentioned above, the department's faculty members are directly involved in teaching and mentoring medical, undergraduate and graduate students, even before it formally became a department. We have a number of formal course offerings at all student levels (see **APPENDIX P**) and have been involved in the education of hundreds of students.

Evidence of Instructional Quality. Instructional quality is largely evidenced by the popularity of our formal course offerings and membership in our extracurricular volunteer student groups. The department often turns away students for course enrollment due to consistently reaching maximum capacity. This has historically been true of both undergraduate and College of Medicine third- and fourth-year courses.

For the third- and fourth-year courses, instructional quality is reflected by student performance on national exams (medical student shelf exams), as well as in preparation for residency as indicated by our high success rate in the residency match, graduation from residency and subsequent entrance into fellowship programs (see Section I). Anecdotal evidence from other schools shows our students are fully prepared and well trained for emergency medicine rotations.

Quality Assessment. For undergraduate courses, quality assessment is completed through student feedback surveys, along with course-end and annual evaluations. Additionally, direct feedback to instructors is provided during the course. For College of Medicine courses, quality assessment is completed through student feedback surveys and course-end evaluations. Additionally, PhD-level instructional assessors are invited to sit in on lectures to evaluate faculty.

Course Planning and Updating Process. For undergraduate courses, curriculum updates and changes are based on surveys, course evaluations and direct feedback. For College of Medicine courses, a yearly spring retreat is held by core medical student teaching faculty to discuss feedback, learning materials and updates for the next year. Learning materials are reviewed and revised by faculty with the goal to update annually to stay current with evidence-based emergency medicine.

Residency Programs

Photo by Kevin Reilly, MD

I. RESIDENCY PROGRAMS

I.1. Overview

The residency programs are key to all of the department's missions. The department's three distinct residency programs – the original three-year categorical residency program based at Banner – University Medical Center Tucson, a newer three-year categorical residency program based at the Banner – University Medical Center South, and a five-year combined emergency medicine/pediatrics training program – together train 78 residents, making us one of the largest departments providing GME training at the UA and nationally.

Emergency medicine residents are fundamental to the academic mission of the department. They are active participants fostering a culture of inquiry and engaging in original research, working with junior and senior faculty on resident-driven, clinical research projects. Our residents are integral to the clinical care provided in our department, treating patients in the emergency departments at B-UMCT, B-UMCS and in the pediatric emergency departments. The vast majority of patients who receive care in these clinical settings are cared for by both an emergency medicine resident and faculty member.

Recent Changes. Over the last several years, the department has developed many strong areas of expertise, including point-of-care ultrasound, critical care, pediatric emergency medicine and simulation medicine. The residencies' curricula have evolved to embrace our expertise in these areas that are becoming central to the practice of emergency medicine.

Training in critical care has been expanded with the implementation of an intern intensive care unit (ICU) rotation at the Southern Arizona VA Health Care System (SAVAHCS) and establishment of the resuscitation captain (a senior resident who oversees and assists with the care of the most critically ill patients in the department). The rotation provides residents with yet another different clinical experience with a different patient population.

We have implemented use of new technology, such as Panopto (a video platform for training, teaching and presenting) through the UA to webcast, record and archive all of our didactic lectures, allowing residents who physically cannot be in the conference room, e.g., being out of town on selective, to remotely join the live lecture. In addition, Panopto provides residents and faculty the opportunity to review lectures that they would like to see again or could not attend.

A closed social networking system, Convo, makes it possible for faculty and residents to safely discuss interesting cases, have clinical discussions and post interesting, educational material. The live chat feature also gives residents joining our conference remotely through Panopto the opportunity to actively participate during the lecture.

University of Arizona College of Medicine – Tucson Program
Since its inception in 1982, the University of Arizona College of Medicine – Tucson Program has been a well-established and respected PGY 1-3 categorical emergency medicine training program. The program has been continuously accredited by the ACGME, graduating 320 emergency physicians to date who are practicing from Maine to Hawaii (**FIGURE I.1.**) in private, academic and government practices, and in urban, suburban and rural settings.

FIGURE I.1. Map of Former UA EM Residents Working in the U.S.
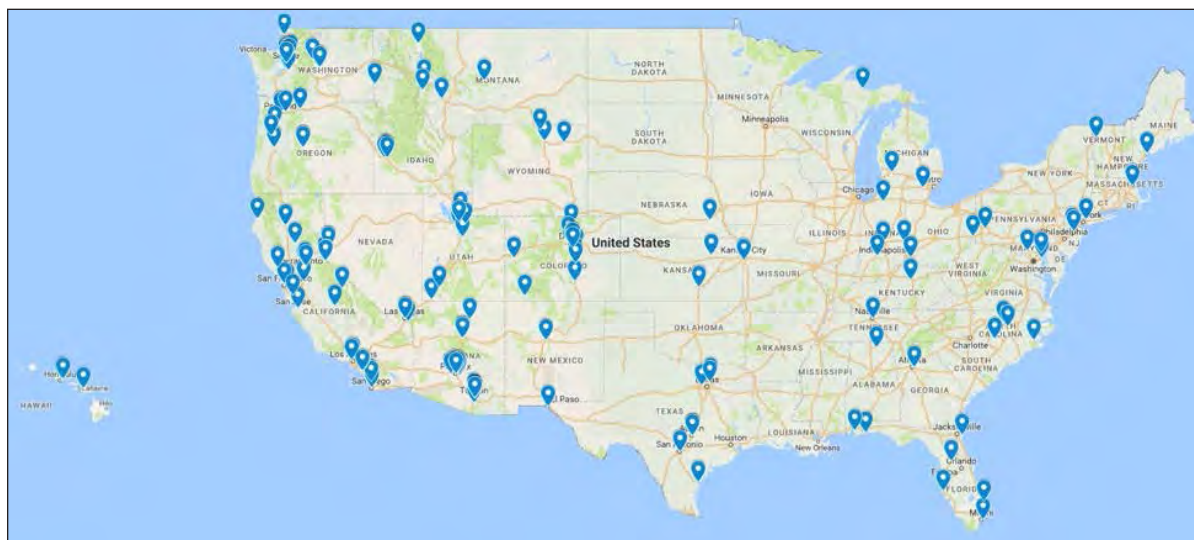
The program has a very strong reputation among U.S. medical students wanting to specialize in emergency medicine. The number of applicants to the program continues to grow each year; last year, 1,016 students applied for the 15 categorical positions. One measure of residency popularity is how far down the rank list training programs need to go to fill their residency. "Ranks to fill" refers to how far a program goes down their rank list to fill the number of positions available for that match year. For example, for 15 positions, a 4.5 ranks to fill means going down to position 67.5 on the program's rank list. Despite being one of the larger emergency medicine training programs (programs with 14 positions were at the 75th percentile in 2014), we have been able to recruit highly ranked students, with 4.5 ranks to fill, putting the program at the 75th percentile nationally (50th percentile is at 6.1 ranks to fill).

Program administration is committed to recruiting diverse applicants, taking a holistic approach to application review and applicant invitation. Hard cut-offs for criteria such as Step 1 and 2 scores are not used to filter out applications. The program directors review all applications and base a preliminary ranking on the overall strengths of the applicants, resulting in inviting some applicants who may not have been invited using hard cut-offs, including many applicants from underrepresented groups.

The program has been under the leadership of Dr. Albert Fiorello since July 2011, who served as associate program director for the preceding seven years. Associate program directors Drs. Alice Min Simpkins, Aaron Leetch and Vivienne Ng are recognized leaders in medical education, emergency pediatrics and simulation medicine.

Future Changes. The program currently is accredited for 16 residents per year, but only is funded for 15. Patient volume has increased and adding another resident would not only help with the increased provider need in our department, but also potentially could allow for adding another rotation to augment the resident experience. Some possibilities include a rotation in the cardiovascular ICU, inpatient cardiology team or the neurology ICU. These rotations offer great potential for our residents, but are not possible now with our current resident complement.

Given that the department is part of Banner Health, we will work on developing relationships with other Banner medical centers so our residents easily can spend selective time in those institutions. If agreements were in place and housing subsidized when these residents are out of town, exposure to other Banner facilities might help with physician retention within the Banner system.

Essential is a sustainable method for funding of the GME programs under the Banner system. Early work this year on developing payment and reimbursement mechanisms has been encouraging, but follow-through is needed to ensure success.

Residency Program Quality. The strong reputation of the program is evidenced by the large number and quality of student applicants. Our matched resident Step 1 and Step 2 U.S. Medical Licensing Examination (USMLE) scores are very close to the mean for residents who match into emergency medicine, which is considered to be a competitive specialty.

The written and oral board pass rate for our graduates is excellent, exceeding the national average. Our graduates easily find positions in the geographical areas and with the groups that they want to join, some of the most desirable in the country. Each year, alumni of our program actively reach out to recruit new graduates to their groups. The number of graduates from our program entering into fellowships has been increasing over the last several years. Some of those graduates have gone on to academic positions after fellowship.

More details and data on quality included in Section I.3.

Use of Information to Increase Program Strength. The program continuously monitors resident performance and intervenes early when residents exhibit any signs of academic difficulty. We have developed a robust Academic Enrichment Plan for residents who do not perform well on the in-training exam. This plan incorporates a rigorous study plan and close faculty mentoring to assure future success, which has been demonstrated by our continued excellent board passage rate, detailed in Section I.3.

We take resident feedback very seriously and use this information to improve the program. Residents from all levels participate in a Conference Steering Committee to make our didactic conferences the best possible. Resident input also is used in future resident selection through unique, brief interviews (FIT sessions) during the applicant's interview day (see Section I.3).

University of Arizona College of Medicine at South Campus Program

The University of Arizona College of Medicine at South Campus Residency Program is a younger PGY 1-3 categorical program emergency medicine training program. The program was in a status of initial accreditation July 1, 2009, to Feb. 14, 2013. Since that time, continued accreditation status has been awarded each year. Most of our 28 graduates practice on the West Coast in a variety of settings, including private practice and in academic and rural hospitals.

Although a newer program, it too is well-respected and desired by medical students seeking specialization in emergency medicine. Last year, the program received more than 700 applications for only six categorical positions. Even as a smaller program at six residents per year (programs with 8.0 positions were at the 25th percentile in 2016), we are able to be very effective in our recruitment of highly ranked students, with a 2.4 ranks to fill (programs with 4.5 ranks to fill were in the 75th percentile in 2016).

At the forefront of program leaders' agenda when reviewing medical student applications is diversity. The program director uses Electronic Residency Application Service (ERAS) filters, not as a tool of elimination, but rather as a tool to assist in the evaluation of an applicant's strengths and weakness. No hard cut-offs are put into place for criteria, such as a Step 1 and 2 scores. Every application is personally reviewed by the program director, Dr. Lisa Stoneking, who then places applicants into a preliminary rank list based on her review.

Most of the residents work at B-UMCS and B-UMCT. Residents alongside emergency medicine faculty members provide care to the majority of patients in those facilities.

Recent Changes. The development of subspecialty areas, such as point-of-care ultrasound, critical care, pediatric emergency medicine and simulation, has occurred over the past couple of years. These developments, all of which have become critical to the practice of emergency medicine, have resulted in our resident curriculum evolving in order to embrace them. Implementation of an ICU rotation for PGY-1 residents has expanded the critical care training within our program.

Dr. Stoneking was appointed program director October 2013, after previously serving as associate program director. Dr. Anna Waterbrook was named associate program director as of November 2013. Patrick Mulligan, BS, joined our team in July 2016 as program manager. Also in July 2016, we decreased our number of core faculty from eight to seven secondary to Banner core faculty funding limitations.

Future Changes. Currently, the program is accredited by ACGME for six residents per year. The College of Medicine GME Office has been supportive of growing the program to eight residents per year; however, funding has been an issue in making this change. A major goal of the program is seeking funding for the two additional residents to better provide care for our growing patient volume, which has increased from 43K at the program's inception to 54K annually. Increasing the number of residents would allow us to once again have eight core faculty members for additional education support. Another benefit would be the possibility of adding a new rotation at Banner Payson Medical Center to augment our program's focus on rural health and offer a valuable experience to the residents.

Another goal of the program is to expand and strengthen our relationship with Banner Health. By developing relationships with other Banner medical centers, our residents can choose to do their selective rotations at these facilities. This would open up more experiences for our residents' selective rotations and possibly assist these facilities in the recruitment of our residents.

Residency Program Quality. Our program receives a number of excellent medical student applications each year. We attribute this to a number of factors, including the sound reputation in the emergency medicine residency community. Our matched resident percentage of AOA membership is in the 75th percentile at 40 percent, with the national mean for emergency medicine being 16.7 percent.

Graduates of our program enjoy the ability to find positions in many geographical areas with some of the most desirable groups in the country. Although the program only has graduated four classes so far, our alumni reach out to our program each year to recruit new graduates.

Use of Information to Increase Program Strength. Evaluation and observation of resident development and performance is a focal point of our program. This allows program leadership to detect and monitor early signs of academic or clinical deficiencies. Also, the development of a Board Preparation Plan helps residents who need additional study assistance and structure preparing for the written boards. Resident feedback is another tool used for program improvement. Residents have the ability to evaluate the following: conference sessions, rotations, faculty, etc. Evaluations are then reviewed by program leadership to make appropriate changes to strengthen the program.

University of Arizona College of Medicine Combined Emergency Medicine/Pediatrics Program

Established in 2005, the PGY 1-5 program is approved by the American Board of Emergency Medicine and the American Board of Pediatrics. ACGME approval is through the respective categorical programs. Since the program's inception, 13 dual board-eligible physicians have graduated and are practicing throughout the country in private, academic and government practices and in urban, suburban and rural settings.

The program is the largest of only four combined emergency medicine and pediatric programs in the country. It has a strong reputation among U.S. medical students seeking to specialize in both emergency medicine and pediatrics, and the number of applicants continues to grow. Last year, 68 students applied for the three positions. We have been able to recruit highly ranked students, with routinely less than two ranks to fill.

Like the other two residency programs in the department, program administration is committed to recruitment of diverse applicants, taking a holistic approach to application review and applicant invitation. Hard cut-offs for criteria such as Step 1 and 2 scores are not used to filter out applications. Instead, program directors in both emergency medicine and pediatrics departments review all applications and base a preliminary ranking on the overall strengths of the applicants. The thorough dual-set review results in inviting some applicants who might not have been invited using hard cut-offs, including many applicants from underrepresented groups.

The program is under the leadership of Dr. Dale Woolridge, combined program director, Dr. Albert Fiorello, emergency medicine program director, and Dr. Sean Elliott, pediatric program director. Additional oversight is through contributions of both programs' associate program directors, Drs. Hillary Franke, Alice Min Simpkins, Aaron Leetch and Vivienne Ng, all recognized leaders in medical education, pediatric critical care, emergency pediatrics and medical simulation.

Emergency medicine/pediatric residents are fundamental to the academic missions of both emergency medicine and pediatrics departments. Emergency medicine/pediatric residents participate in original research, working with junior and senior faculty on resident-driven, clinical research projects (emergency medicine residency curriculum), and a quality improvement project (pediatric residency curriculum).

Emergency medicine/pediatric residents are integral to the clinical care provided in both departments. The residents work at the B-UMCT and B-UMCS hospitals in the pediatric emergency department, pediatric inpatient units and in continuity clinics throughout the community. The vast majority of patients who receive care in these clinical settings are cared for by emergency medicine/pediatric residents and emergency medicine or pediatric faculty members.

Recent Changes. Over the last several years, the emergency medicine/pediatric residency program has developed many strong areas of expertise through both departments, including point-of-care ultrasound, critical care, pediatric emergency medicine, inpatient hospitalist care, adolescent and child abuse services and medical simulation. Training in pediatrics has been guided by the ACGME to track curriculum pathways. Training in pediatric emergency medicine has incorporated a senior "pre-tending" role, where the resident learns leadership and department management skills. We expanded the use of the New Innovations evaluation process, in which patients have the opportunity to provide real-time shift-based evaluation through all emergency and pediatric clinical settings.

Future Changes. The program currently is accredited for four residents per year, but only is funded for three. Even as the largest combined emergency medicine/pediatric program in the country, patient volume has increased and adding another resident could help with the burgeoning provider need in our departments. Banner Health includes facilities with two other dedicated pediatric emergency departments. Currently, the B-UMCT Pediatric Emergency Department has successfully recruited internally to staff almost the entire department. A future goal would be to promote recruitment to the other Banner pediatric emergency departments.

Residency Program Quality. The large number of excellent students applying to our program and the quality of those we match are indications of the strong reputation of our program. Our matched resident Step 1 and Step 2 USMLE scores are very close to the mean for residents who match into emergency medicine. The written and oral board pass rates for our graduates exceed the national average. Our graduates easily find positions where and with whom they choose. The number of our graduates entering into fellowships has been increasing over the last several years.

More details and data on quality included in Section I.3.

Use of Information to Increase Program Strength. The program continuously monitors resident performance and intervenes early when residents exhibit any signs of academic difficulty. We have developed a robust Academic Enrichment Plan for residents who do not perform well on the in-training exam. This plan incorporates a rigorous study plan and close faculty mentoring to assure future success, which has been demonstrated by our continued excellent board passage rate. Resident feedback is taken very seriously to help us improve the program. Residents from all levels participate in a Conference Steering Committee to improve our didactic conferences. Resident input also is used in future resident selection through unique, brief interviews (FIT sessions) during the applicant's interview day.

I.2. Curriculum, Courses, Clinical Training and Research

Adequacy of Curriculum

The curriculum of each of the three residency programs reflects the American Board of Emergency Medicine's Emergency Medicine Model of Practice recommended guidelines (EM Model), and is tailored to meet the mission and objectives of that program. Our didactic curriculum is planned by core content topic. Each four-week block has an assigned core content theme and the lectures during that block follow that theme. Lecturers and experts in other specialties are invited to make presentations as well.

Our clinical rotations comply with ACGME expectations. Residents receive training in areas of obstetrics/ gynecology, trauma, orthopedics/sports medicine, anesthesia, cardiology and critical care to augment and enhance their core emergency medicine training. The breadth of our faculty's subspecialty expertise in pediatrics, emergency ultrasound, EMS, toxicology, critical care, sports medicine, clinical informatics and medical education benefits the residents in obtaining a balanced and extensive training experience

Opportunities for Research

As a part of the Information Mastery Curriculum/ScholarQuest, residents are required to participate in original research and a scholarly presentation. The objective of the three-year integrated Information Mastery Curriculum is to enable our graduates to fully understand and use the scientific literature in their future practice, whether that be primarily clinical or as a physician-scientist. The curriculum has three longitudinal courses: Journal Club, Evidence-Based Medicine and ScholarQuest.

ScholarQuest (**APPENDIX Q**) is a resident research curriculum that provides residents with hands-on training to conduct, present and publish original hypothesis-driven research in the field of emergency medicine. All emergency medicine residents participate in ScholarQuest and receive training and assistance for each stage of their research, including obtaining IRB approval, designing and implementing research studies, collecting and analyzing data, interpreting results, submitting an abstract to a national or regional meeting, presenting at a national or regional meeting and manuscript preparation.

The department's research focus results in at least two ScholarQuest projects being published in peer-reviewed journals per year. The department actively works to increase the number of published articles each year by actively supporting resident research. The ScholarQuest curriculum has two main components:

- didactic lectures on basic biostatistics and epidemiology (e.g., study design, hypothesis testing, power and sample size requirements); and
- direct assistance with the development of a scientific research project from hypothesis to study completion.

The program is codirected by our associate head for research, Dr. Kurt Denninghoff, and emergency medicine faculty epidemiologist, Dr. Tomas Nuño.

Breadth and Depth of Clinical Training

Our residency programs are fortunate to have strong clinical training experiences that cover the breadth of emergency medicine. Our residents are taught by faculty with strong clinical experiences ranging from academic to community settings and with the many subspecialties of emergency medicine as previously

mentioned. Our off-service rotations provide residents with a greater understanding of these specialties and their application to the emergency medicine practice. Our procedural training is more than sufficient and further augmented by simulation experiences in the cadaver lab and the Arizona Simulation Technology and Education Center (ASTEC). Through electives, residents have opportunities to tailor and enrich their training with further experiences and pursue their own interests. **TABLE I.1.** details the curriculum for each program.

TABLE I.1. Residency Programs Curriculum

KEY: ☐ 4 WEEKS ☐ 2 WEEKS

University of Arizona College of Medicine – Tucson Program Curriculum

PGY I	Orientation/ED	ED	ED	ED	ED	ED	ED	ED	Medical Intensive SAVAHCS	ED SAVAHCS	Emerg Surg/Trauma	Ortho		OB	Anesth	Vacation	Vacation	Ultra-sound
PGY II	ED	ED	ED	ED	ED	ED	ED	ED	Pulmonary	Surgical Intensive	Cardio	Tox	Selective		Vacation	Vacation		
PGY III	ED	ED	ED	ED	ED	ED	ED	ED	ED	EM TMC	Ped Intensive	Selective		Vacation	Vacation			

University of Arizona College of Medicine at South Campus Program Curriculum

PGY I	Orientation/ED	ED	ED	ED	ED	ED	ED	ED	Medical Intensive	Emerg Surg/Trauma	Sports Medicine	OB	Cardiology		Vacation	Vacation	Ultra-sound
PGY II	ED	ED	ED	ED	ED	ED	Rural Medicine	Surgical Intensive	EM/Peds	NICU	Tox		PICU		Vacation	Vacation		
PGY III	ED	ED	ED	ED	ED	ED	ED	EM/Peds	Acute Care	Global Health	Selective		Vacation	Vacation				

Emergency Medicine/Pediatrics Curriculum

	EMERGENCY MEDICINE	26 weeks • 6.5 blocks							PEDIATRICS	26 weeks • 6.5 blocks						
YEAR 1	Orientation	ED	ED	Ultra-sound	Trauma	VA ICU	Anesthesia	Vaca-tion	Inpatient Wards	Inpatient Wards	Inpatient Wards	Inpt. Wards	Outpatient Clinic	Hem/Onc	Vaca-tion	Ped ED

	EMERGENCY MEDICINE	28 weeks • 7 blocks							PEDIATRICS	24 weeks • 6 blocks						
YEAR 2	Sports Med	Ortho	ED	ED	ED	OB	Selective	Surgical ICU	Vaca-tion	Adolescent	Outpt. Clinic	Vaca-tion	Behavioral/ Developmental Clinic	Elective	Neonatal ICU	Ped ED

	EMERGENCY MEDICINE	24 weeks • 6 blocks						PEDIATRICS	28 weeks • 7 blocks						
YEAR 3	ED	ED	ED	ED	PICT	CCU	Vaca-tion	Inpatient Wards	Outpt. Clinic	Ped ED	Elective	Elective	Research QI	PICU	Vaca-tion

	EMERGENCY MEDICINE	28 weeks • 7 blocks							PEDIATRICS	24 weeks • 6 blocks						
YEAR 4	ED	ED	ED	ED	Tox	Selective	Selective	Vaca-tion	Vaca-tion	Inpt. Ward	Elective	Free Elective	Neonatal ICU	PICU	Ped ED

	EMERGENCY MEDICINE	24 weeks • 6 blocks						PEDIATRICS	28 weeks • 7 blocks						
YEAR 5	ED	ED	ED	ED	Community ED	Selective	Vaca-tion	Inpatient Wards	Outpt. Clinic	Elective	Elective	Free Elective	PICU or NICU	Ped ED	Vaca-tion

Program Modifications and Improvements

The residency programs continuously are reviewed and refined through feedback from the residents and faculty. Annual residency retreats and annual program evaluations provide suggestions for change and improvement. Feedback from resident representatives on a Conference Steering Committee, as well as feedback from faculty and residents shape our didactic curriculum. We plan to continue revising and improving our core content curriculum to provide the most benefit for teaching and learning, preparing for board exams and applying clinical knowledge. Residents and faculty have the opportunity to provide feedback to program leadership at any time through an anonymous electronic survey available on the department's residency website.

Incorporating a cardiac care unit (CCU) rotation is under discussion based on feedback from our residents. We currently partner with the SAVAHCS and community emergency departments to provide our residents diverse clinical experiences, and will continue to seek the best opportunities in these community settings. We also routinely discuss the structure of the off-service rotation within our own institution to make certain our residents receive the best training experiences possible.

Adequacy of Resources

The residents have a charting room in both B-UMCT and B-UMCS Emergency Departments. A resident library currently is located in the AEMRC Training House. Each resident receives an education stipend every year, as well as access to an online core content resource (Rosh Review) for study materials. Senior residents are permitted to use this stipend to attend the national American College of Emergency Physicians Scientific Assembly each year. Residents also are provided with stipends for meals at both hospital cafeterias.

Comparison with Peer Institutions

The department's residency programs compared to the five peer institutions is shown in **TABLE I.2.**

TABLE I.2. Comparison of Residency Programs 2016

Residency Program Curricula (weeks)							
Specialty	Michigan[a]	University of North Carolina	Ohio State	UC Davis	Pittsburgh	UA - Tucson Program[b]	UA - South Campus Program
Orientation/EM	4	2	4	4		4	4
Emergency Medicine	98	98	80	88	86	96	86
EM Acute Care	9						4
Pediatric Emergency Medicine	9 Integrated	Integrated	20	6	17	Integrated	4
Administration		4					
Anesthesiology	1.5	2	2	4	3	4	
Cardiology			4			2	4
EMS	1.5	Integrated	2	2	9		
ENT				2			
Global Health							4
ICU – Cardiac	4			4			
ICU – Medical	8	6	8 or 12	8	11	8	4
ICU – Neonatal	2		2				2
ICU – Neurosurgery		3	2				
ICU – Pediatric	4	4		4		4	4
ICU – Surgical	4	4	0 or 4	4	4	4	4
Medical Education			2				
Medicine Wards				4			
OB/GYN	4	4	2	2	2	2	2
Ophthalmology				2	2		
Orthopedics		4	4	4		4	
Pediatric Ambulatory	2						
Pediatric Inpatient	2						
Physician-in-Triage Peds				2			
Radiology	2						
Research		2					
Rural Medicine							4
Selective/Elective	19	6	8	6	4	8	4
Sports Medicine							4
Toxicology			2	4	2	2	4
Trauma Wards/ICU	13	4	4	4	13	4	4
Ultrasound	4	2	6	2	3	2	2
Vacation	17	12				12	12

[a] Michigan is a 4-year residency program
[b] Combined EM/Peds residency program integrates an equivalent curriculum through each categorical program

Additional Resources Needed for Improvement. Many residents express concern over the small size of the charting rooms and limited number of computers and workspace. The new Banner construction does not include space for a resident library or lounge. Sufficient travel funds and easier method of reimbursement would greatly improve the opportunities for our residents to travel and present at regional and national meetings. Residents also have requested 24-hour gym access, as well as on-site childcare. Now as Banner employees, residents have lost access to emergency childcare services offered to University of Arizona employees. Childcare assistance would benefit residents' ability to work without concern for family issues, and would contribute to wellness in the workplace overall. Additionally, onsite childcare would positively impact the recruitment of high quality faculty, residents and staff.

I.3. Residents

Recruitment

The mission for recruiting, training and graduating quality residents is very similar for the department's three separate residencies. New to the department is the expansion of the programs' robust web-based presence. Medical student and residency program outreach occurs through multiple venues, including:

- **National Conferences.** Each year, the programs share a department-sponsored table with resident and/or attending representation at the two major national emergency medicine conferences: the ACEP (American College of Emergency Physicians) and the SAEM (Society for Academic Emergency Medicine).
- **Department Website**. The department website is maintained internally by Paulette Pierce, and includes residency recruitment information for prospective applications, such as the residency's mission, values, benefits, hours, research and clinical environment.
- **Social Media**. Programs maintain separate Facebook and Twitter accounts. Tucson Program resident Dr. Sara Paradise created and maintains our own unique blog hosted at https://arizonaem. wordpress.com. Launched in 2015, the blog continues to grow and share pertinent medical posts.
- **Podcast**: Drs. Aaron Leetch and Jarrod Mosier launched a highly successful and well-followed podcast, *AZEMcast*, an emergency medicine evidence-based review and opinion audio-file download released on a monthly basis. The podcast, available for free on iTunes, has seen an upswing in downloads over the past year. The July 2016 podcast had 8,675 downloads as of Aug. 19, 2016, which shows the wide reach of the social media network.

The Tucson Program uses a unique interviewing paradigm to both select quality residents and introduce the program to prospective applicants. In addition to interviews with faculty and program directors, the program uses a modified "multiple mini-interviews" session during the applicant's interview day called the Fast Interview Track or FIT. Many current residents have said this unique experience shows the approachability of the program. This also increases resident-to-applicant exposure for selecting candidates that would fit well in the program and in Tucson. The resident interviewer gives each applicant a score, which is incorporated into their applicant profile for selection. The Tucson Program has published methods and results with regards to this unique experience: Min, A, Leetch, A, Nuño, T, and Fiorello, A. "How well will you FIT? Use of a modified MMI to assess applicants' compatibility with an emergency medicine residency program." FIT *Medical Education Online.* 2016; 21. 29587.

The South Campus Program incorporates a similar approach, but with less formality (i.e., no score applied) by using a "team" interview. This is in the form of discussion to learn more about the applicant in a lower stress environment. No data has been collected on effectiveness at this point.

A key component of the interview process is continuing to emphasize resident-to-applicant exposure. The Tucson Program hosts dinners for applicants the evening before each interview day. Held at a resident's home with food provided by a local restaurant, the dinner provides an informal setting for applicants to meet residents and learn about the program. This venue is well received and anecdotally well attended by both residents and applicants. The South Campus Residency Program hosts dinners at a faculty member's home in a similarly informal setting, and it is attended by both residents and faculty. This is reported as

a strength of the program since applicants have a chance to meet and have discussions with faculty on an informal level. Both programs have had good success in applicant interest with home dinners.

Competition for Top Candidates

The United States Medical Licensing Examination (USMLE) held by the National Board of Medical Examiners (NBME) is regarded as a representation of medical knowledge of applicants and their suspected performance on future licensing examinations. It often is regarded as an evaluative tool to assess the competitiveness of each applicant. The caveat is it assesses core medical and clinical knowledge, but not personality or clinical skills.

The Tucson Program USMLE Step 1 and Step 2 scores have been stable and comparable to the emergency matched U.S. seniors. This serves as an indication our program is able to recruit academically talented applicants. See **TABLE I.3.** and **FIGURE I.2.**

The younger South Campus Program has only been collecting USMLE data for the past few years. See **TABLE I.4.** Incoming residents have had a trending increase in USMLE scores, presumably because the now more established program has built a reputation that attracts more competitive applicants. In future years, more robust data collection and monitoring will need to continue for both USMLE scores and ABEM score and pass rates.

TABLE I.3. Tucson Program USMLE Scores

Tucson Program USMLE Scores							
	2009	2010	2011	2012	2013	2014	2015
USMLE Step 1	230	238	227	217	225	226	224
National Average	221	222	225	227	228	229	229
EM Matched US Seniors	222		223			230	
USMLE Step 2	248	247	240	230	234	244	236
National Average				237	238	240	240
EM Matched US Seniors	230		234			243	
US Senior Match Rate in EM	93%		90%			93%	

FIGURE I.2. USMLE Step 1 and Step 2 Average Score
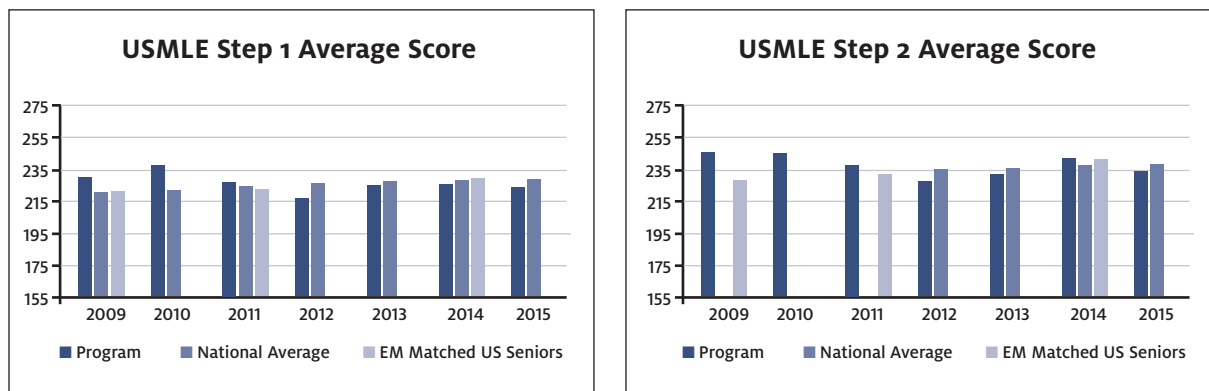
TABLE I.4. South Campus USMLE Scores

	South Campus USMLE Scores													
	2009		2010		2011		2012		2013		2014		2015	
	UA	All	UA	All	UA	All	UA	All	UA	All	UA	All	UA	All
USMLE 1 median (IQR)	NA	NA	223.5		213		225		242.5		223		222	
In-service median (IQR)	NA	NA			76.5		76.5		74.5		76		75	

Resident Quality

The American Board of Emergency Medicine (ABEM) written exam pass rate for Tucson Program has experienced significant improvement and success since 2009 (see **TABLE I.5.** and **FIGURE I.3.**). The first attempt pass rate now exceeds the national average, and of those who did not pass on first attempt, all have passed on subsequent attempts at rates greater than the national average. The seven-year average on first pass attempt is equal to the national average. This increase in scoring is multifactorial, but represents the programs' recruitment of competitive applicants, robust conference curriculum and effective clinical teaching atmosphere. The Tucson Program's American Board of Emergency Medicine (ABEM) oral exam pass rate has been 100 percent each year since our last review (see **FIGURE I.4.** and **TABLE I.6.**). This is consistently better than the national average.

In addition, our resident scholarly output has been highly productive over the last seven years, with increasing numbers of poster presentations seeing completion through manuscript publication (see **TABLE I.7.**). The department has significant resident involvement in research through the robust required ScholarQuest program. Many residents take extra initiative and present their data at local and national conferences.

TABLE I.5. Tucson Program ABEM Written Scores and Pass Rate

Tucson Program ABEM Written Scores and Pass Rate								
	2009	2010	2011	2012	2013	2014	2015	7 yr Average
First Attempt	9/13 (69%)	14/16 (88%)	14/15 (93%)	12/12 (100%)	14/16 (88%)	16/16 (100%)	13/13 (100%)	91%
National Average	91%	91%	91%	94%	89%	90%	91%	91%
Repeat Attempt	1/1 (100%)	4/4 (100%)	2/2 (100%)	1/1 (100%)	-	0/2 (0%)	2/2 (100%)	83%[1]
National Average	59%	60%	54%	59%	46%	50%	52%	57%
[1] 100% overall pass rate with 2 residents requiring 3 attempts								

FIGURE I.3. Qualifying Exam First Attempt Rate

Program   National Average
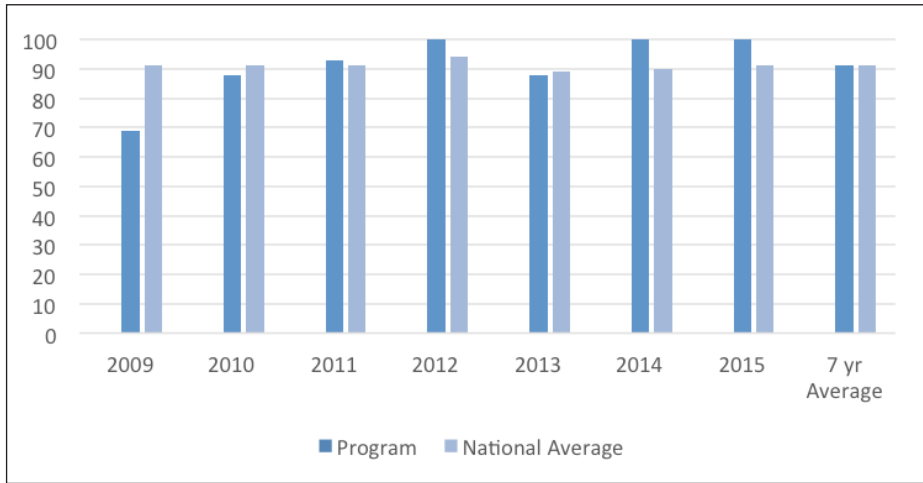
TABLE I.6. Tucson Program Oral Board Certification Results

Tucson Program Oral Board Certification Results								
	2009	2010	2011	2012	2013	2014	2015	7 yr Average
First Attempt	11/11 (100%)	10/10 (100%)	18/18 (100%)	16/16 (100%)	11/11 (100%)	16/16 (100%)	16/16 (100)%	100%
National Average	95%	94%	97%	98%	98%	96%	98%	97%

FIGURE I.4. Oral Examination Pass Rate

Program   National Average
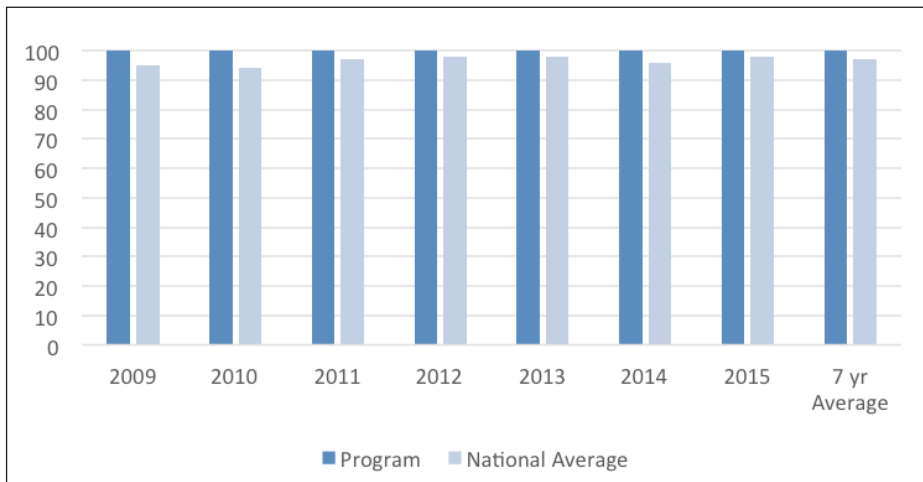
TABLE I.7. Tucson Program and South Campus Program Resident Scholarly Output

| Tucson Program Resident Scholarly Output							
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
	EM ONLY	EM/ EMPEDS	EM/ EMPEDS	EM/ EMPEDS	EM/ EMPEDS	EM/ EMPEDS	
# of poster presentations	32	17	31	34	21	25	25
# of publications	6	8	7	6	10	15	

South Campus Resident Scholarly Output							
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
# of poster presentations	-	-	-	27	32	5	12
# of publications	-	-	-	0	1	0	8

Recruitment and Retention from Underrepresented Ethnic Groups

The department's residency programs seek out highly competitive applicants. When medical students apply to our residency programs through ERAS, we are able to filter applications based on many factors, including underrepresented groups. The South Campus Program's Spanish Language Immersion Training for residents and the emphasis on rural practice helps to increase recruitment for diverse applicants. **TABLE I.8.** shows the department's residents' gender and race/ethnicity.

TABLE I.8. Residents Gender and Race/Ethnicity

Tucson Program Diversity AY 2016-2017		
Gender	Females	Males
EM (45)	16 (35%)	29 (65%)
EMPeds (15)	8 (53%)	7 (47%)
Overall: (60)	24 (40%)	36 (60%)

Race/Ethnicity	Caucasian/White	Black	Asian	Native American	Hispanic/Latino	Other
EM (45)	30	0	7	0	7	1
EMPeds (15)	12	0	2	0	0	1
Overall: (60)	42	0	9	0	7	2

South Campus Diversity AY 2016-2017		
Gender	Females	Males
EM (18)	4 (22%)	14 (78%)

Race/Ethnicity	Caucasian/White	Black	Asian	Native American	Hispanic/ Latino	Other	Prefer not to say
EM (18)	11	0	1	0	1	2	3

Culture

APPENDIX R includes some of the department's residents' comments and the ACGME Annual Survey Results for 2015-2016 for the three residency programs. A common theme from the comments is the approachability of the faculty.

Resident Placements

Our Tucson Program and Combined Emergency Medicine/Pediatric Program graduate placement in community practice has evolved over the last seven years from nearly all graduates entering community practice to one-third of graduates entering into fellowship training (**TABLE I.9.**). Compared to our peers, we have lower placement into academic practice as the first job out of training, but a higher placement into fellowships. Our South Campus Program graduates have a similar ratio of graduates entering into fellowship training to community practice (**TABLE I.10**.).

TABLE I.9. Tucson Program Graduate Placement (EM and EM/Peds)

Tucson Program Graduate Placement (EM and EM/Peds)									
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**7 yr average**	**2011 National Comp.[1]**
Community Practice	12 (92%)	16 (89%)	12 (67%)	8 (62%)	12 (67%)	12 (67%)	13 (77%)	74%	57%
Academic Practice	0	1 (5.5%)	1 (5.5%)	0	1 (5.5%)	0	0	2.5%	26%
Fellowship	1 (8%)	1 (5.5%)	5 (27.5%)	5 (38%)	5 (27.5%)	6 (33%)	4 (23%)	23.5%	13.5%
Remained in Arizona	4 (31%)	11 (6%)	10 (56%)	4 (31%)	5 (28%)	10 (55%)	5 (29%)	43%	

[1]Burkhardt J, Kowalenko T, Meurer W. Academic career selection in American emergency medicine residents. Acad Emerg Med. 2011 Oct;18 Suppl 2:S48-53. doi: 10.1111/j.1553-2712.2011.01181.x. PubMed PMID: 21999558.

TABLE I.10. South Campus Graduate Placement

South Campus Graduate Placement							
	2009	2010	2011	2012	2013	2014*	2015
Community Practice	--	--	--	--	7	4	5
Academic practice	--	--	--	--	--	1	--
Fellowship	--	--	--	--	3	1	1

*2014 grad class - One is coming back to fellowship this year, but originally went to community practice.

Alumni View of Residency Experience

We surveyed our residency graduates using the alumni email listserv. **APPENDIX S** lists unabridged responses. A common theme from the alumni survey is to incorporate the "business" of emergency medicine more into the core curriculum of residency. This is understandable given the daily challenges of emergency physicians also include the business aspects of practicing medicine. Availability is limited in the core curriculum. However, further developing our administrative track is a potential avenue to address these issues.

I.4. Fellows or Post-Doctoral Trainees

During our last APR, we offered two fellowships (research and sports medicine). Since that time, our department added seven new fellowships, resulting in up to 14 fellows on faculty at a given time (**TABLE I.11.**). Our fellowship growth has coincided with the subspecialty expansion of emergency medicine and offers our resident trainees exposure to these subspecialties at an early stage. Subspecialty fellowships permit residents who desire further education in a particular track to spend elective time, participate in research and quality improvement projects and prepare for fellowship applications at the end of their intern year. In addition, all fellows work some portion of their clinical effort as attending physicians in the emergency department, providing the opportunity to not only develop as attending physicians, but also to develop the interface of their subspecialty practice with their primary specialty practice at the same time. It also gives resident and student trainees access and exposure to these subspecialties on a daily basis.

Department challenges with subspecialty fellowship growth mostly are clinical and financial. With state graduate medical education funding on the decline, new fellowships and expanding current fellowship spots are increasingly scrutinized. Second, many of these subspecialties require a clinical infrastructure to allow for growth. In particular, critical care offers an incredible opportunity for resident and fellowship training, especially given the interface with many of the other fellowships offered, including emergency ultrasound, toxicology, research, palliative care, EMS and simulation. However, in order to grow that subspecialty section, a clinical infrastructure that includes a dedicated clinical area will be necessary, requiring significant investment from our hospital and health-care delivery partners.

Fellowship Program Descriptions
Critical Care Medicine. We were one of the first emergency medicine departments in the country to establish a fellowship that leads graduates to board certification in CCM. Associate Professor Dr. Jarrod Mosier is ABEM CCM diplomate #001. The ACGME-accredited program is cosponsored with the Department of Medicine. We have a thriving group of emergency medicine CCM faculty, including Drs. Jarrod Mosier, Cameron Hypes and Lawrence DeLuca.

Emergency Medical Services. An ACGME-accredited subspecialty board, the EMS Fellowship capitalizes on the department's already existing critical mass of national experts in EMS. Fellows have a unique opportunity to be mentored by the pioneers and current research leaders of prehospital medicine, Drs. Harvey Meislin, Terence Valenzuela, Daniel Spaite, Bentley Bobrow, Joshua Gaither and Daniel Beskind.

Clinical Informatics. A recently ABMS-approved subspecialty, the Clinical Informatics Fellowship focuses on content specific to emergency medicine clinical operations and big data analytics made available by modern electronic health record systems. Faculty members Drs. Lisa Chan and Kevin Reilly dedicate substantial academic and clinical time to informatics.

Hospice & Palliative Medicine. A recent ACGME-approved subspecialty, the Hospice & Palliative Medicine Fellowship is led by one of the few academic emergency medicine physicians who is fellowship trained, Dr. Michelle Rhodes. Fellows learn how to implement traditional concepts of palliative care in the acute care emergency department setting.

Emergency Ultrasound. Not yet ABMS-approved, but a rapidly growing subspecialty and competency within emergency medicine, the Emergency Ultrasound Fellowship is academically one of the top programs in the country. Led by Dr. Srikar Adhikari, the program includes additional fellowship-trained faculty, Drs. Lori Stolz, Richard Amini, Lucas Friedman, Albert Fiorello and Nicholas Stea.

Medical Simulation. A rapidly growing and nearly ubiquitous pillar of education within graduate and undergraduate programs, the Medical Simulation Fellowship has fellows working with outstanding emergency medicine and College of Medicine mentors, Drs. Vivienne Ng and Allan Hamilton.

Fellowships and unique training opportunities new or re-engineered since the last APR:
Medical Toxicology. This ACGME-approved fellowship capitalizes on the unique assets of the Southwest, the Arizona Poison and Drug Information Center and the strong University of Arizona Center for Toxicology. The program is led by Dr. Mazda Shirazi, who also is medical director for the poison center.

Academic Research. The Academic Research Fellowship offers academic training in clinical and translational research, as well as close mentoring by experienced research faculty led by associate head for research, Dr. Kurt Denninghoff.

Sports Medicine. In collaboration with the UA Departments of Family and Community Medicine and Orthopaedic Surgery, this ACGME-approved fellowship is led by two fellowship-trained emergency medicine faculty members, Drs. Anna Waterbrook and Allison Lane. Faculty and fellows serve as team physicians for UA student athletes, as well as practice and train at the Arizona Institute for Sports Medicine.

TABLE I.11. Growth of Fellowship Training Programs

Fellowship	# Years of Training	Year Started	# Graduates	# Fellows/ Year	ACGME	Comments
Academic Research	1-2	2006	2	1	No	One fellow was cosponsored with Trauma
Sports Medicine	1	2007	11	1-2	Yes	Cosponsored with Family Medicine
Critical Care	2	2010	5	1	Yes	Cosponsored with Pulmonary/Critical Care
Emergency Ultrasound	1	2011	13	2-3	No	
Medical Toxicology	2	2011	1	1	Yes	
Hospice & Palliative Medicine	1	2013	2	1	Yes	Cosponsored with Medicine
EMS	1	2014	2	1-3	Yes	
Informatics	2	2014	1	1	No	
Medical Simulation	1	2016	0	1	No	First fellow started 7/1/16

I.5. Medical Student and Resident Learning Outcomes Assessment

Expected Learning Outcomes

The learning outcomes are distinct for three academic programs: Medical Student Emergency Medicine/Critical Care (EM/CC) Rotation, Medical Student Acting Internship (AI) and Residency.

Medical Student EM/CC Rotation. The EM/CC Rotation for medical students consists of laboratory and didactic sessions, self-directed online learning modules, emergency department and intensive care unit (ICU) shifts, a critical care workbook and a final written exam.

The department's training mission for this course is to provide academic and clinical training in emergency medicine and critical care to third- and fourth-year medical students sufficient to achieve the following knowledge and outcome skills. Students must demonstrate the ability to:

- Understand basic principles in emergency medicine and critical care.
- Take a thorough and concise history and give a physical exam on patients in the emergency department and ICU in an efficient manner.
- Synthesize appropriate differentials and plans on both critically ill patients in the ICU and emergency department and patients of all acuity levels in the emergency department.
- Analyze and summarize patient information and present it to resident and attending physicians in a focused manner.
- Perform basic emergency medicine procedures, including suturing, splinting, slit lamp exam and FAST exam.
- Appropriately document history, physical exam, review of systems, differentials and plan.
- Effectively care for the ventilated patient in the ICU setting.
- Differentiate the "sick" and "not sick" patient.
- Take and incorporate feedback on presentations, knowledge base and procedural skills.
- Understand the scope of emergency medicine and systems-based practice as it relates to inpatient and outpatient care.
- Work ethically and professionally with emergency department staff.

Medical Student Acting Internship (AI). The department's training mission for the Medical Student Acting Internship is to provide academic and clinical training in emergency medicine to fourth-year medical students sufficient to achieve the following knowledge and outcome skills. Students must demonstrate the ability to:

- Work independently, similar to a beginning resident physician, and work closely with the attending physicians.
- Understand basic principles in emergency medicine.
- Take a thorough and concise history and give a physical exam on patients in the emergency department in an efficient manner.
- Synthesize appropriate differentials and plans on patients of all acuity levels in the emergency department.
- Analyze and summarize patient information and present it to attending physicians in a focused manner.
- Perform basic emergency medicine procedures, including suturing, splinting, slit lamp exam and FAST exam.
- Appropriately document history, physical exam, review of systems, differential and plan.
- Differentiate the "sick" and "not sick" patient.
- Understand the scope of emergency medicine and systems-based practice as it relates to inpatient and outpatient care.
- Work ethically and professionally with emergency department staff.
- Apply appropriate knowledge and skills in the clinical setting as evidenced by ongoing formative assessment.

Residents. The expected learning outcomes for residents include objective improvements in patient care, medical knowledge in multiple disciplines, systems-based practice, professionalism, practice-based learning and improvement and interpersonal and communication skills. Please see **APPENDIX T** for details.

Assessment Activities

Medical Student EM/CC and Acting Internship (AI) Rotations. Students in both the EM/CC and Acting Internship Rotations are assessed through direct observation by the residents and faculty with whom they work. Students are evaluated on their understanding of basic emergency medicine and critical care concepts, integration of basic knowledge into development of a differential diagnosis, management plan and patient care, and satisfactory performance of basic emergency medicine procedures.

The assessment activities for medical students in both the EM/CC and Acting Internship Rotations occur in both a direct and indirect manner. Students receive feedback directly on shift from residents (EM/CC) and attending physicians (AI) with whom they work closely. This feedback is provided on a regular basis as their skills are shaped. Additionally, students on both rotations are clinically evaluated with shift cards.

Medical students in the EM/CC Rotation receive shift evaluations after each shift from the resident they worked with on that shift. These shift evaluations have residents rank a student as pre-entrustable, barely entrustable, fully entrustable or outstanding on several skill sets. These skill sets include:

- focused history and physical exam
- ability to generate a differential diagnosis
- ability to formulate a management plan
- observation and follow up
- emergency recognition and management
- patient-centered communication
- team-centered communication
- professionalism

Medical students in the Acting Internship (AI) receive shift evaluations and direct feedback from attending physicians after each shift. These shift evaluations are the same evaluations used for the EM/CC students described above.

Each student is assigned a mentor and meets for a formative mid-rotation evaluation. Mentors use an evaluation form based on the shift evaluations, patient logs, H + Ps and feedback the student has received up to that point in the rotation. It ranks the student as "meets expectations" or "below expectations" on core competencies systems-based practice, practice-based learning, professionalism, interpersonal and communication, patient care and medical knowledge. This mid-rotation evaluation ensures adequate progress is being made by students and provides them formal feedback for improvement in their future shifts. This also addresses any particular areas in need of improvement or particular concerns by faculty or residents. The more direct assessment activities are addressed below for both EM/CC and Acting Internship Rotations.

Residents. Starting academic year 2013-2014, ACGME rolled out a new method of evaluating residents to make evaluations more uniform across the board and to give residents more meaningful evaluations. Called the "Emergency Medicine Milestones," this method is what our three programs are using and will continue to use for the foreseeable future.

The American Board of Emergency Medicine states, "The Emergency Medicine Milestones are a matrix of the knowledge, skills, abilities, attitudes and experiences that should be acquired during specialty training in emergency medicine. The Emergency Medicine Milestones will provide a basis for six-month evaluations for emergency medicine residents."

The milestones provide a framework for the assessment of the development of the resident physician in key dimensions of the elements of physician competency in a specialty or subspecialty. They neither represent the entirety of the dimensions of the six domains of physician competency, nor are they designed to be relevant in any other context. They include benchmarks in 23 milestone sub-competencies. Please see **APPENDIX U**.

Outcome Assessments
Medical Student EM/CC Rotation. The overall grade for EM/CC students is based on clinical competency, examination score and ICU workbook completion. The clinical shift evaluations compose 50 percent, the ICU workbook composes 25 percent and the National Board of Medical Examiners (NBME) exam composes 25 percent of the overall grade. All of these are incorporated to give the student an overall percentage. If the student receives 90 percent or higher, they "honor" the course; if they receive 85-90 percent, they "high pass;" if they receive 65-84 percent, they "pass;" and <65 percent does "not pass." The components of this grade are described below.
- **Examination**. An NBME exam is given to the EM/CC students and their score is incorporated into their overall grade in the rotation. Performance on the exam solely is used towards the students' overall grade in the rotation and not incorporated into their assessment clinically. The purpose of the exam is to ascertain the level of understanding and knowledge base in basic emergency medicine principles and concepts.
- **Exam Format and Content.** The exam comprises of 110 multiple choice questions covering material from their lectures (at the beginning of the course) and on-shift clinical learning. It is scheduled in a computer lab at the end of the course. Students are given recommended reading material in emergency medicine (via a CD with learning materials and on the clerkship website).
- **Clinical Competency.** The mastery of clinical knowledge and skills is tracked using a shift evaluation form developed by the emergency medicine clinical faculty. This includes the students' proficiency rating on a scale in the targeted areas mentioned. The student receives a shift evaluation after each of 14 shifts worked in the emergency department with a resident.
- **ICU Workbook.** The student is responsible for completing a workbook while working several ICU shifts in addition to the shifts in the emergency department with residents. This workbook includes written questions on basic ventilator management and other critical components of patient care in the ICU. The workbook is graded based on completion and correct answers. This score is incorporated into the overall student grade and composes 25 percent of the overall grade.

Medical Student Acting Internship (AI). The overall grade for Acting Internship students is based on clinical competency and examination score. The clinical shift evaluations compose 85 percent, and the Clerkship Directors of Emergency Medicine (CDEM) version 2 exam composes 15 percent of the overall student grade. All of these are incorporated to give the student an overall percentage. If the student receives 75 percent or higher, they "honor" the course; if they receive 70-74 percent, they "high pass;" if they receive 50-69 percent, they "pass;" and <50 percent does "not pass."

- **Examination.** The CDEM version 2 exam is given to the Acting Internship students and their score is incorporated into their overall grade in the rotation. Performance on the exam solely is used towards the students' overall grade in the rotation and is not incorporated into their assessment clinically. The exam's purpose is to ascertain the level of understanding and knowledge base in basic emergency medicine principles and concepts.
- **Exam Format and Content.** The exam is composed of 55 multiple choice questions covering material from their lectures (at the beginning of the course) and on-shift clinical learning. The exam and is scheduled in a computer lab at the end of the course. They also are given recommended reading material in emergency medicine.
- **Clinical Competency.** The mastery of clinical knowledge and skills is tracked using a shift evaluation form developed by the clinical faculty. This includes the students' proficiency rating on a scale in the targeted areas described. The student receives a shift evaluation after each of 12 shifts worked in the emergency department with a resident.

Assessment Findings

Medical Student EM/CC Rotation. The results of the NBME examination, ICU workbook scores and shift evaluations are incorporated to each students overall grade. This examination samples the same knowledge and skillset that comprises the learning objectives in our program, and is used to confirm appropriate baseline knowledge of emergency medicine principles. However, this only composes a small percentage of the student's overall grade. Clinical evaluation, assessed with shift evaluations and direct feedback, composes the greatest percentage of the student's overall grade in the rotation. Additionally, the ICU workbook ensures the student has a basic understanding of critical care principles, critical care pharmacology and social dynamics, particularly for the ventilated patient.

Please see **APPENDIX V** for NBME scores, ICU workbook scores and clinical shift evaluation scores, as well as overall scores/grades for the EM/CC students.

Medical Student Acting Internship (AI). The results of the CDEM v2 examination and clinical shift evaluations are incorporated into each student's overall grade. This examination samples the same knowledge and skill set that comprises the learning objectives in our program. Since this is the second rotation (after EM/CC) for most students taking this course, the test is different than the NBME exam. The examination is used to confirm an appropriate baseline knowledge of emergency medicine principles. However, this only composes a small percentage of the student's overall grade. Clinical evaluation, assessed with shift evaluations and direct feedback, compose the greatest percentage of the student's overall grade in the acting internship.

Please see **APPENDIX W** for the overall grade distributions, CDEM exam scores and clinical shift grades for 2012-2016 for Acting Internship students.

Residents. The results of the In-Training Exam (ITE), conference attendance and Emergency Medicine Milestones evaluations by faculty members are incorporated in each resident's overall performance grade. This provides the program directors an overall picture of the resident's performance. Outside rotation evaluations also are incorporated in the resident's performance. Furthermore, residents are given feedback on their efficiency and throughput times for patient care for their review. They also are required to participate in different continuous improvement process projects.

In the end, graduating residents' ABEM certification board exam performance also is reviewed and used to gauge any necessary tweaking to our current training model to fit the needs of the residents.

Changes Made

Medical Student EM/CC and Acting Internship Rotations. Since the last APR, neither EM/CC nor a critical care rotation has become mandatory for fourth-year medical students. In addition, a shelf exam was switched to the NBME exam and CDEM exam for the EM/CC Rotation and Acting Internship students, respectively. This was undertaken to provide a more standardized exam for students.

The curriculum for both the EM/CC and Acting Internship Rotations has been updated to correlate with a consensus curriculum used by the Council of Emergency Medicine Residency Directors (CORD) to, again, have standardized learning objectives and didactics covering an agreed-upon set of topics. These topics also are influenced by feedback received from medical students each year.

Since the last APR, students on the EM/CC Rotation are allowed to rotate in the pediatric ICU and the Banner – University Medical Center South ICU for the critical care portion of the rotation. The shift evaluation cards have changed to give more specific feedback to students. Previously the form focused on assessing student level of interest, judgment/problem-solving ability, clinical skills and personal effectiveness. The evaluation form now is more targeted and specific and covers a wider variety of skill sets. This change gives students more informative feedback to better understand which skills need improvement. Additionally, the grade cutoffs for honors, high pass and pass are adjusted each year to aim for an honors rate near 25 percent.

Residents. University of Arizona College of Medicine – Tucson Program and Combined Emergency Medicine/Pediatrics Program. The biggest change was the ACGME Milestones Assessment. This has altered the way we evaluate residency performance in many ways, including now having shift cards and Clinical Competency Committee meetings twice a year to discuss the progress of every resident.

The Core Content curriculum delivery is being fine-tuned almost every year related to feedback from residents and ITE scores. As newer modes of education delivery surface, such as mobile apps, we are encouraging their use to help the new generation of learners make the most of them.

We always have provided some type of learning material for the residents. In past years, it was a textbook, but we now have Rosh Review, an online and app-based core content question bank that allows program directors to monitor each resident's usage and performance.

We also have implemented Academic Enrichment Plans for residents who perform poorly on the ITE exam. This plan entails monthly meetings with a faculty adviser, adherence to a study plan, monthly check-ins with assistant program directors, no moonlighting privileges, limited selective opportunities, etc.

The emergency medicine changes in the combined program directly reflect the categorical changes. Pediatrics went through track curriculum, but the combined residents were exempt.

University of Arizona College of Medicine at South Campus Program. A Board Preparation Plan currently is used in both the Tucson Program and South Campus Program. Please see **APPENDIX X**. Residents complete a homegrown self-evaluation twice a year to provide program directors a feel for how residents view themselves clinically and academically.

Given that the South Campus Program is the newest of the three emergency medicine residency programs, not many specific changes are needed. As new tools become available, the need for change is evaluated.

Department Outreach

Photo by UA College of Medicine – Phoenix

J. DEPARTMENT OUTREACH

J.1. Overview

Beyond the walls of the Department of Emergency Medicine, we consider outreach fundamental to our status as part of a land grant university. Our faculty members are engaged in many outreach programs that improve the health and well-being of the communities in Arizona and beyond.

As indicated in **APPENDIX Y**, many of our physicians serve as medical directors for local EMS and fire services, as well as the Arizona Department of Health Services (ADHS). We work hand-in-hand with EMS organizations, providing continuing education and training for emergency medical personnel locally, nationally and internationally. Our faculty members are national and international leaders in emergency medicine organizations, reviewers for national journals, and volunteers for disaster medical teams and community groups.

Some of the many outreach initiatives by the department and its Arizona Emergency Medicine Research Center (AEMRC) include:

Disaster Training

For more than 20 years, the department and the AEMRC have been worldwide leaders in hazmat and disaster preparedness education. Through the leadership of Drs. Frank G. Walter and Harvey Meislin, we offer multiple comprehensive courses designed to provide health-care providers from a wide variety of backgrounds with the training necessary to care for patients injured in a disaster or involved in a hazmat incident. The Advanced Hazmat Life Support (AHLS) program has trained more than 16,200 physicians, nurses, paramedics, pharmacists and other health-care professionals from 64 countries on the critical skills needed to treat victims exposed to toxic substances.

With national and international impact, AEMRC's Preparedness Training Institute offers a variety of courses on emergency preparedness. Training includes continuing education credit for advanced disaster preparedness and response, recognizing and responding to a terrorist event, managing public health emergencies and other courses on emergency response. The Advanced Disaster Preparedness & Response (ADPR) clinical response program trains personnel to recognize and use current triage systems, learn typical hazards in various scenarios (tornado, flood, earthquake) and the ABCDE paradigm of ADPR.

Injury Prevention

For the past 35 years, AEMRC has been helping the U.S. Consumer Product Safety Commission (CPSC) prevent product-related injuries and deaths by providing emergency visit data involving an injury associated with a consumer product. The center also provides training on consumer product safety on behalf of the U.S. Consumer Product Safety Commission.

Cardiac Arrest Education

AEMRC has made tremendous strides in saving lives by translating basic science advancements in cardiopulmonary resuscitation (CPR) research into action by emergency providers. Those discoveries have led to important changes in national standards and spawned the enormous need to widely disseminate these techniques to every emergency medical services (EMS) provider and in-hospital medical professional, as well as to the general public.

AEMRC has partnered with the Arizona Department of Health Services (ADHS) to implement successful public health programs, such as the Save Hearts in Arizona Registry & Education (SHARE) Program. The SHARE Program has collected more than 20,000 out-of-hospital cardiac arrest events from more than 150 EMS agencies, 40 hospitals and nine emergency medical dispatch centers in Arizona. SHARE promotes a system of care approach for improving survival from cardiac arrest in Arizona.

Another program to increase the number of cardiac arrest survivors is the HeartRescue Project in the U.S. and the HeartRescue-Global Project currently underway in China and India. AEMRC is a founding partner of the Arizona project with collaborations with ADHS, the UA Sarver Heart Center and more than 100 EMS agencies. The project coordinates education, training and the application of evidence-based best practices among the general public, first responders, emergency medical services (EMS) and hospitals.

Our faculty members have partnered with 911 dispatchers to implement a Telephone Cardiopulmonary Resuscitation (TCPR) training program, which has shown to increase survival rates and favorable outcomes for patients who experienced an out-of-hospital cardiac arrest. Based on American Heart Association recommendations, the program involves training telecommunicators at 911 centers throughout Arizona to recognize out-of-hospital cardiac arrest (OHCA) calls and deliver instructions to bystanders to provide CPR.

AEMRC held its first two "High Performance CPR University" training sessions in 2015 and 2016 in the Center for Simulation and Innovation at the UA College of Medicine – Phoenix. EMS personnel from across the nation, as well as Japan and Taiwan, took part in the high-fidelity training sessions.

Along with the Tucson Fire Department, the department participated in the 2014 HeartMap Challenge AED Scavenger Hunt. The goal of the month-long community-wide AED scavenger hunt, which ran September 2015, was to raise awareness about AEDs and to build a comprehensive database of the devices' locations. More than 1,300 AEDs were found in the Pima County by 170 participants. Similar contests were held across the country to build a national registry of AEDs.

Traumatic Brain Injury Project
AEMRC-Phoenix has led the NIH-funded Excellence in Prehospital Injury Care (EPIC) Project to implement the nationally vetted Traumatic Brain Injury Prehospital Guidelines. More than 120 Arizona EMS agencies are participating in the project, and more than 10,000 EMS providers have been trained in guideline-standard care.

Global Emergency Care
Emergency medicine director of the Rural & Global Health Program, Dr. Bradley Dreifuss, is co-founder of the Global Emergency Care Collaborative (GECC), whose mission is to create quality sustainable emergency care systems in resource-limited settings that traditionally lacked these services. The project's pilot location is a rural district hospital in Uganda where, since 2009, local mid-level providers called emergency care practitioners (ECPs) have been trained to provide clinical services to emergency department patients. The program utilizes a train-the-trainer model and since its inception, GECC-trained emergency care practitioners have treated more than 35,000 patients who otherwise would not have received this care.

More Outreach Activities
The department hosted the 2015 SAEM Western Regional Meeting held in Tucson. Dr. Frank Walter served as one of the program committee chairs and department faculty were session presenters. More than 300 emergency medicine professionals attended the meeting.

The department co-hosts with Banner – University Medical Center an annual EMS Provider of the Year Awards celebration to recognize outstanding EMS providers in Southern Arizona.

Department residents and faculty participated in the 2015 national philanthropic campaign, Emergency Medicine Residents Association (EMRA) EM Day of Service, raising money, food and products for the local charity Wings for Women's "No Hungry Kids Tucson."

Dr. Dale Woolridge is the medical director of the Southern Arizona Children's Advocacy Center, which provides an array of investigative and advocacy services to child victims of abuse and their non-offending family members. Expert medical evaluations, videotaped forensic interviews, crisis intervention and case coordination with law enforcement and Division of Child Safety are all provided in one place.

Under the leadership of Dr. Daniel Beskind, UA medical students conducted free training in lifesaving skills, such as chest-compression-only CPR, to members of the general public using resuscitation mannequins. In 2013, the students taught 3,004 people compression-only CPR. The group conducted training in 2014 at the Tucson Festival of Books and Catalina Foothills High School.

Dr. Mazda Shirazi is the medical director of the Arizona Poison and Drug Information Center. The center provides medical advice about medications and toxic exposures around the clock for both community and medical professionals throughout Arizona.

Dr. Srikar Adhikari participates in follow-up echocardiography screenings offered free to Flowing Wells Junior High School students as part of the Andra Heart Project, a community organization that runs screening programs in Tucson in an effort to detect and treat cardiac disease in teens.

Our faculty are often called up by the media to serve as experts to educate the public on emergencies, such as snake bites, heat related illnesses, narcotics and CPR.

Department faculty members host shadowing opportunities in the emergency department to different student groups from the local high schools, community colleges and the UA. We estimate >200 students experience bedside medicine and work with experienced clinicians.

J.2. Outreach Goals and Quality

Outreach is an integral part of the mission of the University of Arizona. Our outreach activities extend the department's research knowledge to nonacademic as well as academic audiences. It also extends the department's teaching capacity to off-campus learners to further reach our goal to advance our translational research and education missions.

Based on attendance, evaluations and community input, our outreach programs have made lasting impacts on the Arizona external community. Most prominently, out-of-hospital cardiac arrest survival rate in Arizona has dramatically increased by more than 60 percent due to the direct efforts of the outreach programs in the department.

Collaboration with Other Units

Photo by Kevin Reilly, MD

K. COLLABORATION WITH OTHER UNITS

K.1. UA Collaborations and Partnerships

The Department of Emergency Medicine works with numerous units across the UA campus. Many of our physicians are dual-boarded and have compelling areas of interests that bring them together with other College of Medicine departments, as well as other colleges. Several of our faculty members have dual appointments with other university departments. Collaborations and partnerships include: Valley Fever Center for Excellence; Arizona Center on Aging; Arizona Respiratory Center; Arizona Simulation Technology and Education Center; Arizona Telemedicine and Telehealth; Arizona Arthritis Center; Sarver Heart Center; Steele Children's Research Center; UA College of Pharmacy's Arizona Poison and Drug Information Center, the Center for Toxicology, and the Medication Management Center; the College of Public Health's Preparedness and Emergency Response Learning Center, the Global Health Institute, and the Canyon Ranch Center for Prevention and Health Promotion; College of Medicine – Phoenix Center for Simulation and Innovation, and Center for Toxicology and Pharmacology Education and Research; College of Engineering; and Department of Psychology.

K.2. Changes Contemplated

The department's relationships across campus continue to grow in the area of research. With a centralized UAHS Research Administration, the Research Gateway at the UA Office for Research and Discovery and the department's recent hires of dedicated research faculty and staff, we anticipate our research programs will grow and reach across even more UA and College of Medicine centers and departments. All of these efforts would have greater success with more resources. The administrative staff is stretched thin and some of their time has been involved with Banner information requests and changes in the functioning of programs, especially the resource infrastructure due to the Banner partnership. Collaborations require not only the efforts of the faculty, but also faculty administrative support so that partnerships can function more efficiently. See **APPENDIX Z** for listing of faculty collaborations.

Faculty Planning

Photo by Kevin Reilly, MD

L. FACULTY PLANNING

L.1. Faculty View

The department conducted a survey in August 2016 of faculty members to generate input regarding their views of the department and its future direction. Faculty members responding to the survey overall believe the department is on track on its objective to provide the highest level of clinical care to the population served by B-UMCT and B-UMCS, as well be a viable and user-friendly referral center for entire southern Arizona region. They are enthusiastic about reaching the department's research goal to rise in ranking from 18th to 10th for emergency medicine NIH funding.

Areas the respondents listed as concerns and future objectives:

Clinical

- We must reframe emergency care as not just being episodic (revolving door) care, but also part of a better integrated Banner system that serves as more of an obvious health system strengthening function. The improvement of operations within our hospital settings is necessary to reassure patients that Banner is serious about meeting their needs.
- We need to get patients to the right place, where there is best use of resources and time. Achievement of these goals requires availability of outpatient appointments and an easy process for obtaining these appointments.
- A dedicated team of staff trained on all Banner resources/processes and medical insurance should help patients navigate the health-care system. The practice model of emergency care needs to be adapted and integrated with this dedicated team in order to direct patients quickly to the most appropriate resources. For instance, patients who present to the emergency department and who do not need emergent care are referred to outpatient resources instead of entering the emergency department. Patients from outside facilities requiring admission will be directly admitted.
- The physical front space of the emergency department, Rapid Medical Evaluation (RME), determines if the presenting patient has an emergency condition. The RME needs physical reconstruction for proper workflow, patient comfort, patient privacy and staff and provider workspace. If directing patients with non-emergent conditions to an outpatient resource is not possible, our current Fast Track will still be needed to serve as a bridge between emergency visit and outpatient follow up.
- As with the RME, the Fast Track requires physical reconstruction. Patients with emergency conditions should have optimal emergency department throughput time so their care is efficient and other patients waiting to enter the emergency department can be brought back quickly.
- Specific processes need to be enhanced to maximize our patient throughput time. These include consultation times, results from ancillary tests, placement of admission orders, assignment of inpatient beds, appropriate staffing, proper and reliable equipment and electronic health records, and ordering of only emergent consults and tests. A pod system, which would require increased staffing, may improve patient flow. While in the emergency department, patients should be cared for with the appropriate number of staff and providers, who are skilled at critical care and who are continually trained on new medical discoveries and health-care regulations.
- Another area for improvement is serving the rural-area Spanish-speaking and Native American populations, who are either transferred from or bypass outside rural centers. This focus could be augmented by: a) professional full-time in-person Spanish language interpreter in both emergency departments; b) increased training in cultural nuances and cultural humility with our emergency department staff and providers; and c) development of tele-emergency medicine services for consults to referring hospitals, which will likely increase both quality of transfers, as well as volume of transfers.
- In order to make improvements, reports are necessary. We need a way to generate reports quickly and easily so we can clearly define starting point, end point and track progress.

Education

- We need to continue to recruit and train high-level residents and students who at the completion of residency and are well-prepared to practice in any clinical setting: city, suburb, rural and border areas. Particularly, rural and border areas will require funds to develop additional cooperative relationships for faculty research collaborations, resident rotations and administrative support. This also will require the explicit support from Banner Health, indicating their desire to better train residents to function in the rural resource-limited setting.
- The recruitment and retention of emergency medicine faculty to collaborate on these projects and share in the role of teaching is important. Teaching outside the clinical arena and at the patient bedside should be acknowledged. The amount of time, effort and effectiveness of teaching should be tracked and recorded and faculty compensated accordingly. Without the excellent training of students and residents, community health facilities will not have the providers needed to deliver efficient, competent care.

Research

- Faculty envision a research infrastructure where students, residents and faculty can obtain support and education for conducting all aspects of research, including running statistics, developing collaborations and writing proposals. Faculty members feel that much of their research successes are due to their own efforts of trial and error and work-arounds. They would be more productive if they had help and support.
- Some faculty feel new research leadership is needed to develop an infrastructure that supports all faculty members, not select ones. Faculty would like to expand the research efforts to provide protected time for those who would like to conduct unfunded, but important research.

Administration

- Many of our faculty have administrative duties, but are not compensated for much of them. They feel if they are not compensated, they should at least have administrative support. Faculty members need administrative support to carry out clinical, education and research work. Student workers, research assistants and administrative assistants are needed to complete non-physician tasks so faculty can focus on clinical, education, research and other academically productive service work that can only be completed by highly trained and dedicated emergency physicians.

L.2. Program Planning and Incentives

The new Banner physician compensation plan aims to tie RVU productivity to compensation. From what we know now, our faculty in general stand to benefit from both the fixed and variable/incentive aspects of the plan because of our high productivity. We are a group incentive model in the plan with an 85/15 split between group and individual incentive. This allows everyone to benefit from the high group productivity while minimizing disadvantage for physicians in shifts with lower RVU earning potential. At the same time, it allows the faculty with truly outstanding individual scores to gain incentive credit individually.

However, the Banner incentive plan is primarily based on clinical productivity with 2 percent rewarded for academic productivity. As our physicians have an average 75/25 split between clinical and academic effort, this plan does not adequately address academic achievement and needs.

A major issue is the need for more protected time for academic activity, including teaching, research and administration. We receive 5 percent of Banner CFTE funding support for additional protected time. This is insufficient to even meet our minimal required academic and administrative expectations that are unfunded, such as committee work, basic scholarly work, classroom teaching and professional service. Before Banner, academic activity was funded by the practice plan and included all faculty except pure clinical series faculty. Currently, many gaps remain in academic funding. Our ACGME residency program key/core faculty members are not funded for the 7 percent of time above their mandated cap of 1,340 clinical hours against 1,440 hours for a 1.0 CFTE. Our fellowship directors are not funded for their work, nor do we have funded fellowship coordinator positions. Our ArizonaMed teaching hours are not adequately funded, forcing faculty to cut back on teaching as their distribution of effort must match their

distribution of funding. Faculty committee time is not funded. Our research cost share expenses are not funded, forcing us to rely on internal resources. All of these issues are the subject of ongoing discussion with Banner and the College of Medicine.

Finally, we have proposed a research stimulus package that will enable us to build our infrastructure as our principal investigators pursue more extramural funding. This will help the department reach its goal to go from 18th to 10th in emergency medicine NIH funding.